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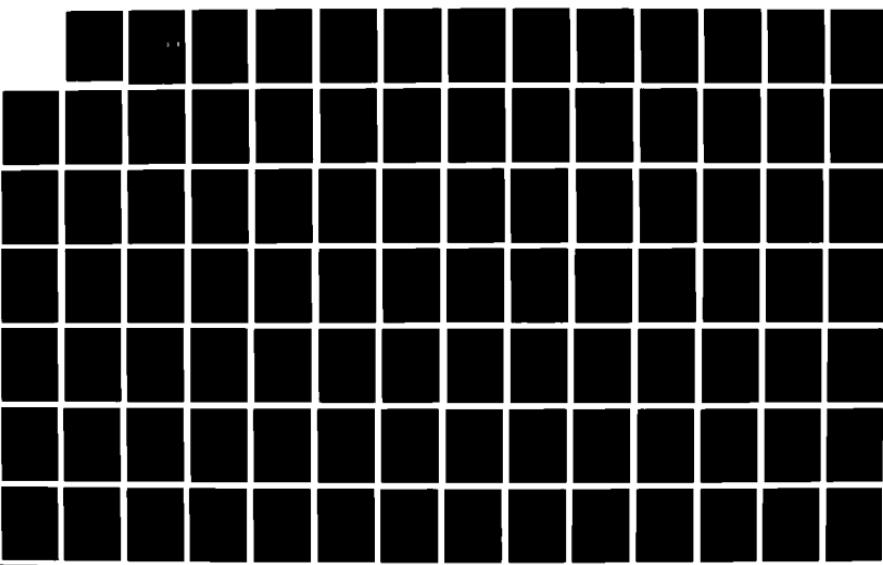
DELIBERATE RIVER CROSSINGS: HISTORIC EXAMPLES VERSUS
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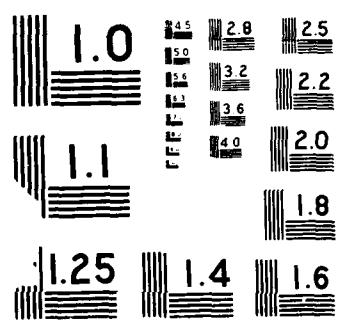
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DELIBERATE RIVER CROSSINGS:
HISTORIC EXAMPLES VS CURRENT DOCTRINE

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

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by

DAVID G. TARBOX, MAJ. USA
B.A., The Citadel,
The Military College of South Carolina, 1971
M.S., New Mexico State University, 1980

Fort Leavenworth, Kansas
1987

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THESIS APPROVAL PAGE

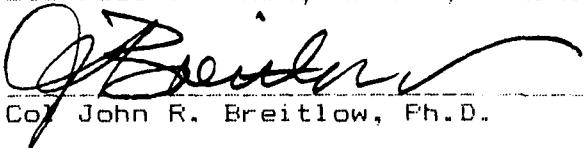
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Title of thesis: Deliberate River Crossings: Historic Examples Vs. Current Doctrine

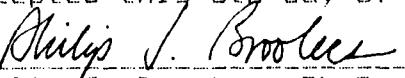
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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. References to this study should include the foregoing statement.

ABSTRACT

DELIBERATE RIVER CROSSINGS: HISTORIC EXAMPLES VS CURRENT DOCTRINE: An analysis of deliberate river crossings over three rivers in central Europe in February 1945 to determine if current river crossing doctrine as presented in Field Circular 90-13 is historically sound, by Major David G. Tarbox, USA. 170 pages.

this
This study is an historical analysis of deliberate river crossings performed by four U.S. Army divisions in February 1945: the Sixth Armored Division, the Eighth Infantry Division, the Eightieth Infantry Division, and the Eighty-Fourth Infantry Division. This analysis examines each division's performance, based on historical records. Conclusions are based on the techniques used by these divisions and on the reasons why these divisions were able to perform successful river crossings.

This paper also describes and analyzes current river crossing doctrine, as contained in Field Circular 90-13, Counterobstacle and River Crossing Operations, March 1987.

This study compares the reasons for success in the historical river crossing operations with the conceptual framework of current doctrine.

This analysis concludes that current river crossing doctrine as set forth in Field Circular 90-13 is historically sound. However, there are omissions in the current doctrine that should be corrected prior to publication of Field Circular 90-13 as a field manual. (Kf) ←
The omissions include--

o The use of combat patrols to gather intelligence for the commander. (This is not mentioned in the FC.)

o Development of the enemy order of battle by the G-2 prior to a river crossing.

o The division of tasks between divisional and corps engineers and guidelines for command and control of the corps assets supporting the division.

o The consideration of the employment of direct fire assets in the fire support plan for the assault.

o Performing as much engineer and other preparatory work during the hours of darkness to preclude visual observation by the enemy.

o Determining the necessity of the traffic control plan by judging if it meets the needs of the three key criteria--maneuver, supply, and evacuation.

o The need to plan logistic support in two phases--support to the preparation and assault, and support to the bridgehead. A case would be made for the addition of a third phase, support to the continuation of the offensive action out of the bridgehead.

o Defining the position of the crossing site commander.

o Amending FC 90-13 to delete the requirement that forces be sent across the river strictly according to a timetable.

o That comprehensive training for a crossing begin as soon as the warning order is received.

o The training of the assault force engineers, the infantry-engineer assault force, and the bridge-building engineers on their actual crossing equipment, in their task-organized condition, and under realistic conditions (including fast water if applicable) according to the time available.

o That the individual who should decide when bridge construction is to start is the tactical commander. He may delegate this authority to his engineer.

o Prescribing in current doctrine the lines of command and control from the crossing force commander down to the lowest element in the process.

o Securing the far shore adequately after the assault force has passed through. This would ensure that bypassed enemy pockets of resistance do not bring fire onto rail or bridge sites. It would also preclude the enemy from reinfiltrating.

o Protecting bridges from floating and submerged destructive objects.

o Giving forces following the assault force the task of mopping up bypassed enemy forces and positions.

o Adding a fifth phase to the existing four phases of a river crossing which would be called "continuation of the offense."

The study also makes the following recommendations:

- o That the cited deficiencies be corrected in the next publication of the Army's doctrinal counterobstacle and river crossing manual.
- o That FC 90-13 be augmented with historical vignettes which illustrate the doctrine.
- o That current doctrinal manuals be checked for conflicting doctrine and be corrected.
- o That weather factors affecting river crossings be incorporated into FM 34-81.
- o That FC 90-13 should discuss command and control and logistics support required of corps-level river crossings.
- o That FC 90-13 should consider the use of fixed bridges in the assault where their use would be appropriate.
- o That current field manuals be reduced in verbiage and size.
- o That the Army field a river crossing board game or computer simulation.
- o That the "E-Force" is historically supportable and should be adapted by the Army.
- o That certain publications describing historical river crossings be made mandatory reading for the Engineer Officer Advanced Course.

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DEDICATION

To my wonderful wife, Barbara, and to my equally wonderful daughter, Emily. Without their perserverance and support this thesis would not have been possible.

Also to the veterans of the units studied here. They must have all been magnificent soldiers to have accomplished the things they did. Learning from their experiences made this program worthwhile.

CHAPTER 1

INTRODUCTION

Before World War I (WWI) European wars were small. Warfare did not use massive armies spanning entire countries. World War I changed that. The British and French armies, plus their allies, confronted German armies stretching from Belgium to Switzerland. World War II (WWII) also saw deployment of armies on a grand scale, and without doubt future battlefields will have similar wide frontages.

When studying the art of river crossings, frontage length becomes a key factor. Historically, commanders would locate where the enemy lines ended, cross a short distance away, and attack the enemy flank, thus achieving surprise by maneuver. Two of the more famous examples of this are Alexander crossing the Hydaspes and Napoleon crossing the Rô. (1) However, with the advent of wide frontage warfare, outflanking the enemy at a river has seldom been possible. Armies have had to learn the art of crossing a river in a deliberate way against an enemy well emplaced on the far shore. Deliberate river crossing, therefore, has become the subject of much doctrinal development.

PROBLEM STATEMENT

The US Army has not performed a deliberate river crossing in a wartime environment since the Korean Conflict. The doctrinal manual for river crossings, Field Circular (FC) 90-13, Counterobstacle and River Crossing Operations, (2) is well written and appears to the military layman to be capable of guiding him through a river crossing in wartime. The purpose of this thesis is to determine if FC 90-13 has any basis in historical fact and if it carries forward the tactical lessons learned by our Army in wartime.

Significance

The significance of the problem can be stated simply: If current US Army doctrine is historically unsound, then the Army's ability to fight to win in a river crossing environment will be in serious doubt.

Background

The former field manual (FM) containing river crossing doctrine, FM 90-13, River Crossing Operations, (November 1978), (3) was difficult to read and to understand. It did not clearly express the steps in planning a deliberate river crossing, performing the crossing, securing the bridgehead, or preparing for the continuation of the offense. Because of this, it made me doubt its fundamental soundness and validity. To determine

if the doctrine was historically valid was motivation for my undertaking this thesis in September 1986. However, in March 1987, FM 90-13 was superceded by FC 90-13, Counterobstacle and River Crossing Operations. This, therefore, is the doctrine which will be studied in this thesis.

METHODOLOGY

Since this thesis' objective was to determine if current deliberate river crossing doctrine is historically sound, the most efficient way to arrive at a conclusion was to analyze historical river crossings. Since it was beyond the ability of this thesis to analyze all deliberate river crossings throughout history, the focus had to be narrowed. In order for the analysis and conclusions to be meaningful to current conditions, I selected crossings of as recent vintage as possible. From the literature search, I discovered that World War II best exemplified all conditions as well as being the best documented. However, narrowing the focus to WWII still presented an enormous number of deliberate river crossings for analysis. Therefore, I narrowed the scope to the European theater of operations, specifically to central Europe.

The largest number of deliberate river crossings took place in the shortest amount of time during February 1945. Important also was that by then the Army had experienced two years of nearly continuous warfare in which

to hone its river crossing skills. For these reasons, this study includes only those river crossings that occurred during February 1945. The three rivers were the Roer in the north, the Our in the center, and the Sauer in the south (Figure 1). (4)

My synthetic analysis methodology was to research the units that crossed these rivers, describe their actions, and then draw conclusions about their methods. Chapter 3 contains these descriptions and conclusions.

I then researched the current FC 90-13 to determine current doctrinal methodology on how to plan and conduct a deliberate river crossing. I compared this methodology to the conclusions drawn to determine if the FC was historically sound, and, if so, whether it had any shortcomings.

EUROPEAN THEATER, EARLY 1945

The allied campaign in Italy opened in July 1943 with the invasion of Sicily. It continued until September 1944 with the further allied invasion of the Italian Peninsula at the "toe" of its "boot." This was an extremely hard-fought campaign; the enemy viciously contested every inch of ground. By autumn of 1944, the allies had broken through the famous Gustav Line. Throughout the rest of the winter they attempted only minor advances and waited for favorable weather in the spring of 1945 before resuming the offensive. (5)

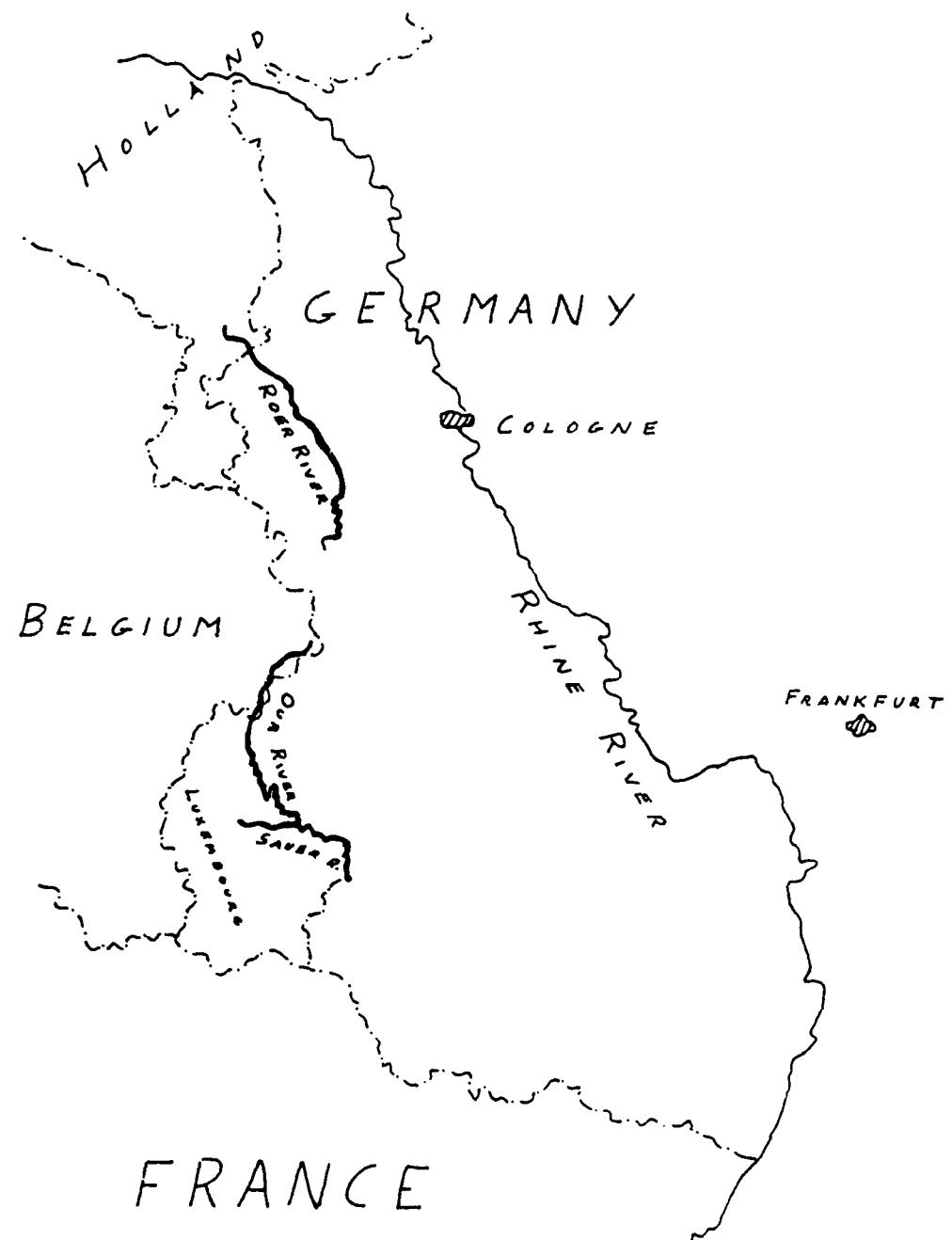


Figure 1. Locations of the Roer, Our, and Sauer rivers.

The central European area of operations remained active throughout the winter of 1944-45. The Germans were pressured continuously by allied forces: the Twenty-First Army Group, commanded by Field Marshal Bernard L. Montgomery; the Twelfth Army Group, commanded by Lieutenant General Omar M. Bradley; and the Sixth Army Group, commanded by Lieutenant General Devers. The allied front stretched from the North Sea to the French-Swiss border.

In February 1945, the Twenty-First Army Group consisted of the Canadian First Army, the British Second Army, and the US Ninth Army. During the same period, the Twelfth Army Group in the theater center consisted of the US First Army and the US Third Army. The southern anchor, the Sixth Army Group, consisted of the US Seventh Army and the French First Army.¹⁶

These armies' activities were twofold: They were to first mop up the last resistance of the German counteroffensive through the Ardennes ("Battle of the Bulge") (December 1944) and then reorganize and prepare to make the final leg of the drive to the Rhine River. This drive had been scheduled for December but had had to be delayed due to the German counteroffensive. Figure 2 shows the disposition of the allied armies in February 1945.

The following paragraphs describe those sectors in which the US Army made the three deliberate river crossings to be studied. The descriptions are brief, meant only to set the stage for Chapter 3. Figure 3 assists the

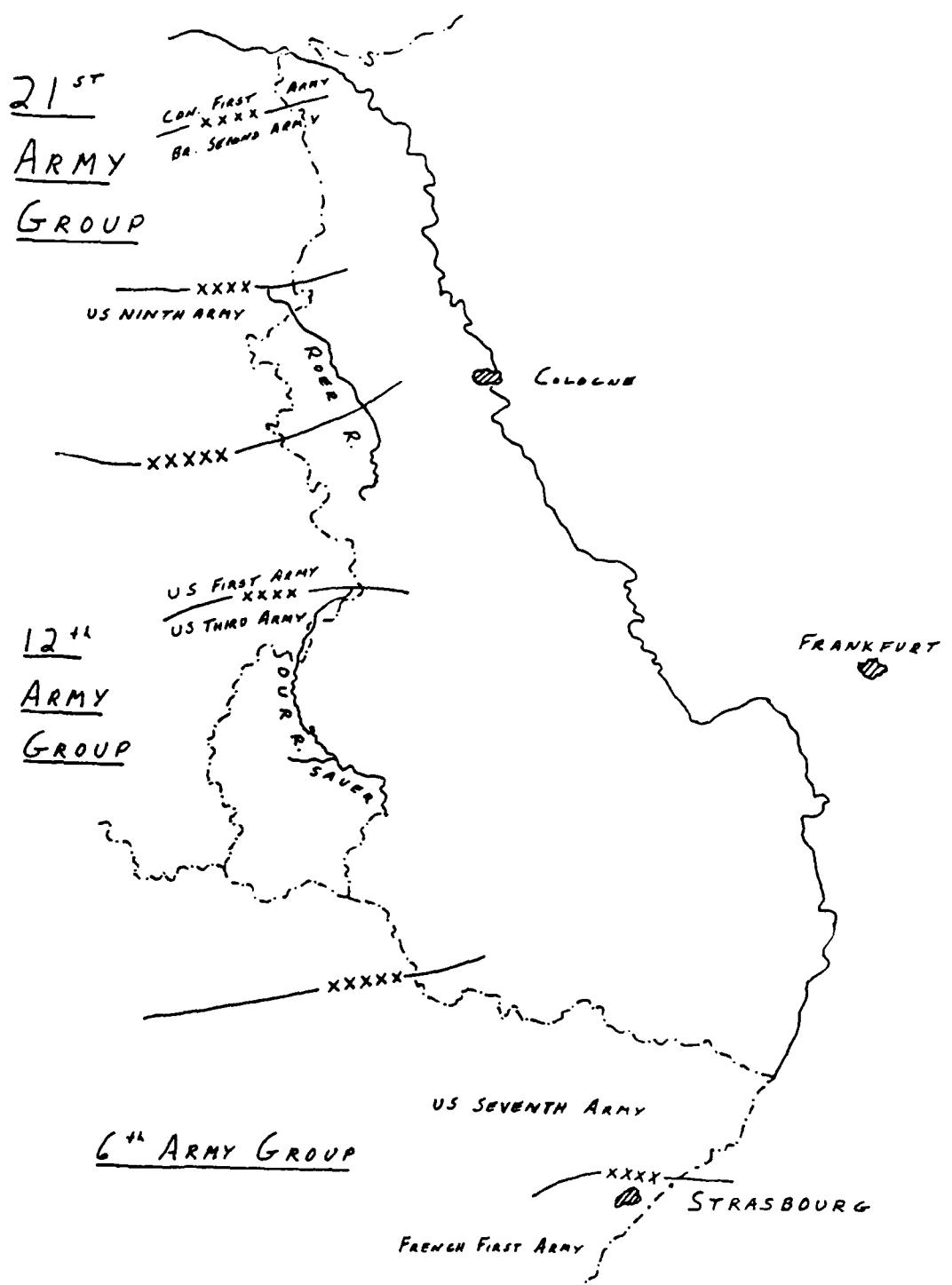


Figure 2. Disposition of the allied armies in February 1945.

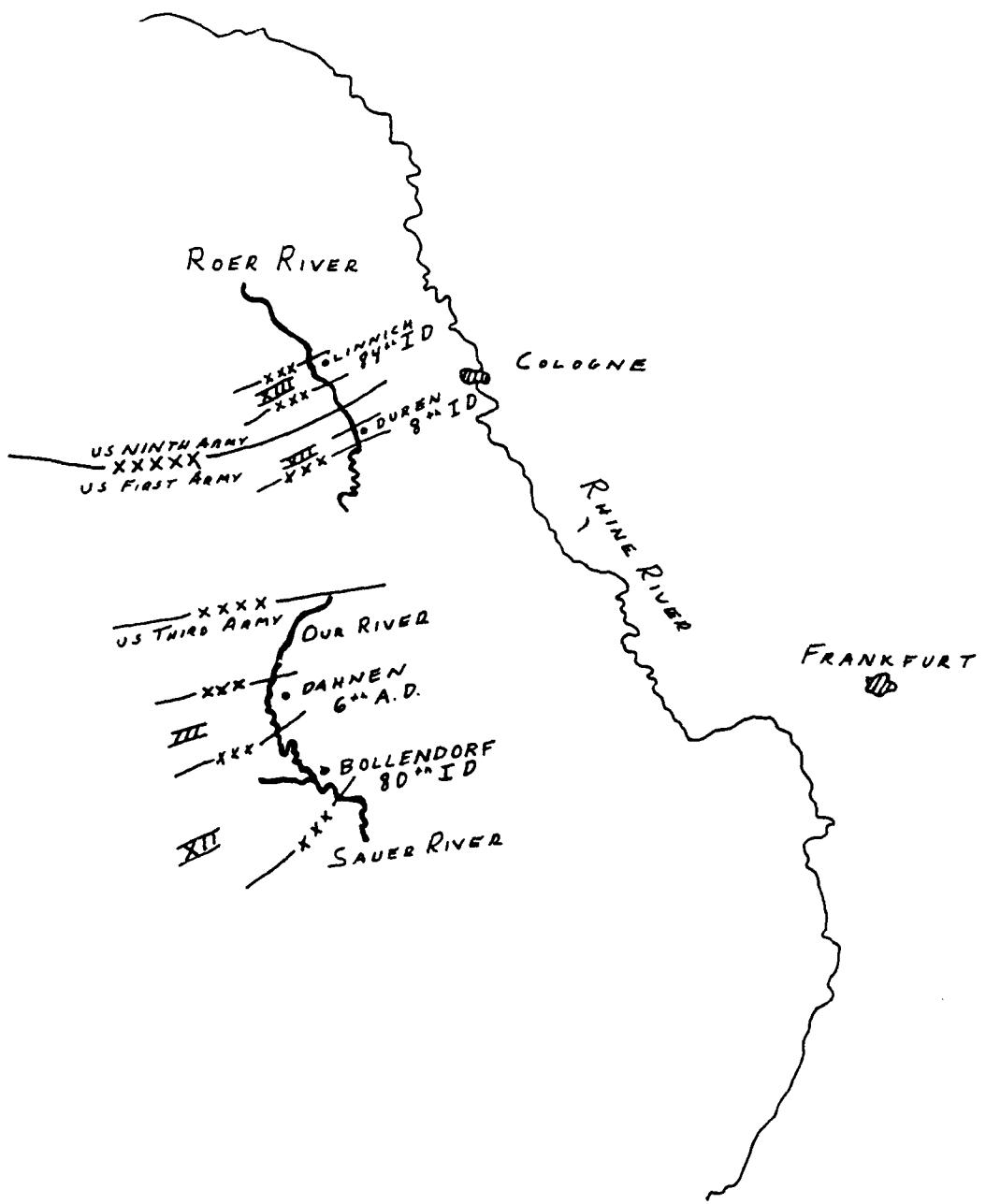


Figure 3. Deliberate river crossing sites.

description by showing the actual crossing sites.(7) The Appendix contains more in-depth details (the Army level plan; corps and division missions; troop lists; river, terrain, and weather characteristics; and opposing forces characteristics).

Roer River Crossing

All three corps of the US Ninth Army and one corps of the US First Army assaulted the Roer River on 23 February 1945.(8) For this study I followed two of the better documented divisions--the Eighty-Fourth Infantry Division and the Eighth Infantry Division.

The Roer River lies in the middle of the Roer Valley, a broad valley with gently elevated terrain at either side.(9) The river was at flood stage during the crossing, making the operation very difficult.(10) The Eighty-Fourth Division's mission was to force a crossing in the vicinity of Linnich to seize and secure a bridgehead.(11) The Eighth Infantry Division's mission was to attack and seize crossings over the river in the vicinity of Duren. The division was to secure the corps bridgehead and protect the corps' right flank.(12) The combat power ratio was approximately 5:1 in favor of the attacker.(13)

Our River Crossing

The III (US) Corps, Third Army, assaulted the Our River on 7 February 1945. The corps was sandwiched between the VII (US) and XII (US) Corps, who were conducting the Third Army's main effort. The III Corps was to support them by conducting operations designed to keep the enemy to its front from shifting over to the other corps' areas. (14) The III Corps was therefore ordered to conduct a reconnaissance in force across the Our River, establishing a bridgehead, if possible, which could be used for future III Corps operations. (15) The Sixth Armored Division performed the main effort of this variation of a deliberate river crossing operation. It was ordered to cross in the vicinity of Dahnen. The combat power ratio was approximately 3:1 in favor of the attacker. (16) However, the defender had the advantage because the Our River was at flood stage, there were steeply wooded hills on both banks, and the Americans faced the interlocking fires of pillboxes sited on the West Wall (also known as the Siegfried Line). (17)

Sauer River Crossing

The XII (US) Corps of the Third Army also assaulted the Sauer River on 7 February 1945. The XII (US) Corps was designated as one of the two main effort corps of a total of four corps constituting the Third Army. (18) The

Eightieth Infantry Division conducted its portion of the attack on the XII Corps' left flank.

Initially the Eightieth Infantry Division's mission was to attack across the Sauer River and to assist the Fifth Infantry Division (main effort) by seizing the high ground northwest of Bollendorf. It was then to continue the attack to the northwest and north in zone to seize the corps objective. Part of the Eightieth Division was to assault across the Our River where the Our meets the Sauer River. Both rivers were crowded on either side by steep and heavily wooded mountains and were at flood stage. The area was also part of the West Wall and was, therefore, heavily fortified with pillboxes having interlocking tires. (19) The combat power ratio was approximately 3:1 in favor of the attacker. (20)

ENDNOTES

(1) U.S. Department of the Army, The Armored School, "Armor in the Deliberate River Crossing." Student Group Research Project (Fort Knox: The Armored School, 1952), pp. 60-61. Alexander crossed the Hydaspes River in 326 B.C. to do battle with Porus who wanted to block Alexander's advance to India. Alexander did not cross directly into the enemy, but rather made feints with his infantry at the center of Porus' lines. He then crossed his cavalry 16 miles north and attacked Porus' flank, thereby defeating him. Napoleon used similar tactics to defeat the Austrians in 1796. In order to fix the Austrians in place, Napoleon made feints along the river to their front, crossed his main body wide of their lines, and then attacked their flanks.

(2) U.S. Department of the Army Field Circular 90-13, Counterobstacle and River Crossing Operations (Fort Leavenworth, KS: U.S. Army Command and General Staff College, March 1987).

(3) U.S. Department of the Army Field Manual 90-13, River Crossing Operations (Washington, D.C.: U.S. Government Printing Office, November 1978).

(4) Order of Battle of the United States Army, World War II, European Theater of Operations, Divisions (Paris: Office of the Theater Historian, December 1945), pp. 1-55; Peter Young, p. 247 (see endnote no. 5).

(5) Peter Young, ed., and Richard Natkiel, cartog., Atlas of the Second World War (New York: G.P. Putnam's Sons, 1974), pp. 118-129.

(6) Ibid., pp. 244-247.

(7) Ibid.

(8) Charles B. MacDonald, The Last Offensive (Washington, D.C.: U.S. Government Printing Office, 1984), pp. 135-136.

(9) Ibid., pp. 137-139.

(10) Hubert S. Miller, CUL, Roer River Crossing (Fort Leavenworth, KS: privately printed; date unknown), pp. 2-3. Currently located in the Combined Arms Research Library.

(11) U.S. War Department, Eighty-Fourth Infantry Division After Action Report (Germany: February 1945), p. 9.

(12) Ibid., Field Order #25.

(13) H.K. Reamey et al., "Roer River Crossing Conducted by the Ninth U.S. Army, XII U.S. Corps, and the Eighty-Fourth Infantry Division," Combat Studies Institute Battlebook Series 19-B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, June 1984). 168 p.

(14) MacDonald, p. 99.

(15) U.S. War Department, III Corps After Action Report (Europe: February 1945), pp. 3-7.

(16) James McCord et al., "Our River Crossing." Combat Studies Institute Battlebook Series 16-B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), pp. 20-23.

(17) Ibid., p. 31.

(18) MacDonald, pp. 99-101.

(19) Chris Bolles et al., "Assault Across the Sauer." Combat Studies Institute Battlebook Series 16-D (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), p. 60.

(20) "Our," CSI Battlebook, pp. 27-28.

CHAPTER 2

REVIEW OF LITERATURE

Since there has been no prior research on this thesis' research question, the primary literary sources I used are the actual after action reports and operations orders of the divisions and corps involved in the crossings. These documents vary in quantity and detail. Some offer almost blow-by-blow accounts; others offer only cursory coverage.

Only the Eighth Infantry Division's after action reports included overlays.(1) Two after action reports included copies of the field orders (today's OPLAN) issued for their river crossing operation.(2,3) Of course (as with most official records) the rationale for why certain tactical decisions were made is rarely recorded. In order to overcome this, I researched the Army's WWII river crossing doctrine found in FM 5-6, Engineer Field Manual.(4) Reading this manual helped me understand why actions were performed as they were. It also helped me to (cautiously) read "between the lines" of the divisions' after action reports.

I also researched the Combat Studies Institute (CSI) Battlebook series, completed in 1984, dealing with river crossings of WWII in central Europe.(5) Each book was

written by a staff group of CGSC students attending the resident course. The report on the Roer River crossing ranks among the best of the studies.(6) The work is particularly scholarly, detailed, and accurate. Other OSI Battlebooks cover the Sauer assault and the Our River crossing.(7,8)

An excellent source which complements the references mentioned above is Charles B. MacDonald's The Last Offensive. (9) MacDonald devotes an entire chapter to "Operation Grenade," the code name for the Ninth Army's Roer crossing. In his book MacDonald combines both the operational and tactical viewpoints. His battle descriptions are excellent and give the reader a good feel for the pulse of the operation.

A particularly good reference for determining the orders of battle for the two February timetrames is the Order of Battle of the U.S. Army. (10) From it I was able to see the theater's "big picture"; that is, which division was assigned to which corps at what time and what corps to what army. This information alone showed how rapidly the Twelfth and Twenty-First Army Groups reorganized between January and early February 1945 and again in mid-February 1945. Complementing this reference is the map collection, with narrative, titled Atlas of World War II. (11) It greatly assisted me in tying the order of battle to the map geography of central Europe.

An excellent study on the purely engineering aspect of the Roer River crossing is COL Hubert S. Miller's booklet, *XIX Corps Engineer*. (12) Using the tactical perspective of XIX Corps, Miller lays out well the terrain and river characteristics, all elements of the staff planning for the crossing, the engineer units assigned to the crossing area, their support relationships, the jobs given those units, the carrying out of those jobs, and the lessons learned from the crossing. This booklet, combined with Chapters IV, VI, and VII of MacDonald's book, should be mandatory reading in the Engineer Officer Advanced Course.

A good source which covers lessons learned at the general level is the "USFET General Officer Board Study.

"Engineer Tactics" written soon after the war's conclusion. (13) In it are the compiled lessons learned (European Theater) of all division commanders, plus all engineer regiment, group, battalion, and separate company commanders. These men were polled as to their opinions on the successful and unsuccessful engineer tactical employments of the theater. Their opinions and recommendations are recorded in this document and it is excellent professional reading. Most of the recommendations are reflected in today's Army. One recommendation, to put the engineer regiment back in the division structure, has yet to be implemented. Hopefully, the engineer school initiative called "E-Force" will finally succeed in implementing that recommendation.

Of minor use to this study were many official reports (observer reports) and pamphlets (command newsletters) issued during the war. Taken by themselves they seem enlightening, but after research, they proved to be based on observations within limited areas of operations. While what is said is true, the data usually only applied to the tactical situation observed. Therefore, I had to deny the urge to make broad-based conclusions on these documents alone. Rather, I had to cross check these reports with unit after action reports before applying the data to that unit.

In March 1987, the Army published FC 90-13, Counterobstacle and River Crossing Operations, (14) which will replace FM 90-13, River Crossing Operations, (15) after field coordination. Field Circular 90-13 is much more complete, easy to read, contains less superfluous verbiage, and is more comprehensive than its predecessor. I researched all of the 22 other AirLand Battle Doctrine field manuals dealing with river crossings in anticipation that they would have to be analyzed along with FM 90-13. However, due to the very recent publication date of FC 90-13, its doctrine takes precedence over the doctrine contained in any previously published manual, thereby obviating the need to include all others in this thesis. The manuals are, however, listed in the bibliography for the reader's convenience.

ENDNOTES

- (1)U.S. War Department, Eighth Infantry Division After Action Report (Germany: February 1945).
- (2)U.S. War Department, Eighty-Fourth Infantry Division After Action Report (Germany: February 1945).
- (3)U.S. War Department, Eightieth Infantry Division After Action Report (Germany: February 1945).
- (4)U.S. War Department Field Manual 5-6, Engineer Field Manual (Washington, D.C.: U.S. Government Printing Office, April 1943, with changes 1 through 6, March 1944 to January 1948).
- (5)Combat Studies Institute Battlebook Series (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1984).
- (6)H.K. Reamey et al., "Roer River Crossing Conducted by the Ninth U.S. Army, XII U.S. Corps, and the Eighty-Fourth Infantry Division," Combat Studies Institute Battlebook Series 19-B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, June 1984), 168 p.
- (7)Chris Holles et al., "Assault Across the Sauer," Combat Studies Institute Battlebook Series 16-D (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), 130 p.
- (8)James McCord et al., "Our River Crossing," Combat Studies Institute Battlebook Series 16-B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), 64 p.
- (9)Charles B. MacDonald, The Last Offensive (Washington, D.C.: U.S. Government Printing Office, 1984).
- (10)Order of Battle of the United States Army, World War II, Operations, Divisions (Paris: Office of the Theater Historian, 1945).
- (11)Peter Young, ed., and Richard Natkiel, cartog., Atlas of the Second World War (New York: G.P. Putnam's Sons, 1974).

(12) Hubert S. Miller, COL, Roer River Crossing (Fort Leavenworth, KS: privately printed; date unknown). Currently located in the Combined Arms Research Library.

(13) U.S. Army General Board, USARET Engineer Tactical Policies, Study 72, XV, February 1947.

(14) U.S. Department of the Army Field Circular 90-13, Counterobstacle and River Crossing Operations (Fort Leavenworth, KS: U.S. Command and General Staff College, March 1987).

(15) U.S. Department of the Army Field Manual 90-13, River Crossing Operations (Washington, D.C.: U.S. Government Printing Office, November 1978).

CHAPTER 3

DELIBERATE RIVER CROSSINGS OVER THREE RIVERS IN WORLD WAR II

This chapter is divided into two parts. Part I contains the study of the deliberate river crossings made over three rivers in World War II. Part II contains the conclusions drawn from analysis of these crossings. The units and their crossings are (in order of presentation): the Eighty-Fourth Infantry Division, the Eighth Infantry Division, the Sixth Armored Division, and the Eightieth Infantry Division.

PART I. DESCRIPTION AND ANALYSIS

The lessons learned from these deliberate river crossings can be studied more conveniently by segregating the activities by phases. Phase I details the crossing's planning and preparation; Phase II details the training performed in preparation for the crossing; Phase III details the actual crossing; Phase IV details all actions required to consolidate the bridgehead; and Phase V details the offensive's continuation.

Phase I. Planning and Preparation for the Crossing

Within Phase I the common planning factors were--
o Intelligence gathering.

o Selection of bridgehead line, objectives, and crossing sites.

o Development of the field order and associated annexes.

Intelligence Gathering

Intelligence gathering was very important to all the units studied. Commanders and staffs took great pains to gather as much knowledge about the enemy, his obstacles and emplacements, the weather, the terrain, and the river as they possibly could.

Since G2s considered the enemy order of battle as extremely important information, developing the order of battle for a river crossing was simply an extension of normal operations. Experience had shown that German soldiers were remarkably well informed.(1) The Sixth Armored Division found that properly interrogated PWs furnished 75 percent of its accurate information. Therefore, G2s sent combat patrols across the river expressly to capture prisoners for interrogation. These patrols not only returned with their captives but also ambushed German patrols, inflicted heavy casualties, and gained valuable information on locations of automatic and heavy weapons, wire obstacles, and minefields.

Most of the German enlisted PWs willingly gave information to interrogators. Under "persuasion," German officers would also talk.(2) The Third Army captured a

German officer in Southern France who was convinced that the war was lost. He felt that by helping the Americans he would be shortening the war. His area of responsibility had been supervision of the construction of the sector of the "West Wall" (Siegfried Line) through which the Americans would have to pass. He was willing to give the G2 staff all the details about where the obstacles and emplacements were, their fields of fire, and the size weapons they could accommodate. The data was checked and verified and then placed on overprinted, large-scale maps (1:25,000 or less). The maps were then distributed to all units scheduled to have these zones as their combat objectives. (3)

February 1945 was as typical a German February as any; freezing weather was accompanied by overcast skies and snow, alternating with above-freezing weather accompanied by overcast skies and rain. But, due to the nature of the relentless allied drive toward Germany, the waging of war in Germany was not allowed to slow appreciably during the winter as it did in Italy. Thus, the periods of thawing accompanied by rain caused severe trafficability problems, turning the predominantly unpaved roads into quagmires. As MacDonald so aptly states in his book, The Last Offensive, "Beginning on 2 February rain fell for eight days, turning foxholes into frigid dirty bathtubs and roads into oozing ribbons of mud." (4) For this reason, engineers of all the

units studied here spent much of their time performing road maintenance prior to the river crossing operations.

To obtain information the engineers and the G2s joined forces. The air corps took aerial photographs which were forwarded through G2 channels to be analyzed. These photographs were assembled into both vertical and oblique assemblages.(5) They were then made available to support engineer studies prior to the crossing. They were also put into the hands of each platoon leader in charge of a crossing site.(6) Engineer patrols were sent to the river to measure its width, current, and depth. The patrols also determined the conditions along the embankments, located cover and concealment along the riverline, and located enemy weapons emplacements on the far shore.

At the Roer River, the 1104th Engineer Combat Group made continuous reconnaissance of the river.

Reconnaissance parties attached themselves to infantry patrols from the division they supported and proceeded to observation posts along the river. These reconnaissance parties remained under cover during daylight and observed river characteristics, bank conditions, and both near and far shore approaches. The patrols made sketches of the conditions at all sites.(7)

The commander of the 1104th Engineer Combat Group summed up his feelings about the importance of good reconnaissance to the success of the operation by saying,

This operation proved conclusively that thorough and continuous reconnaissance contributes

heavily to the success of any deliberate [river crossing] operation. Plans for the Roer River crossing were made far in advance and in complete detail.... Certain adjustments had to be made, not in the basic plan, but in the method of prosecution of work, and such modifications were caused by the tactical situation. Information... obtained by reconnaissance was entirely accurate and adequate and the profits derived from actually having commanders down to platoon commanders and platoon sergeants view the sites contributed greatly to the success of the operation. (8)

Thus, the key points of intelligence gathering for the units studied were--

a Use of combat patrols and interrogation of PWs and line crossers to gather information. This information was later used to develop the enemy order of battle and to assist in selecting the bridgehead line, objectives, and crossing sites.

b Understanding the weather and its potential effects on the operation.

c Using engineer reconnaissance patrols and aerial photography to analyze the river for suitable crossing sites and for avenues of ingress and egress.

Such intelligence enabled the commander to know the enemy's strengths, weaknesses, and locations. This in turn helped him to better plan the operation.

Selection of the Bridgehead Line, Objectives, and Crossing Sites

At this point intelligence gathered from G2 and engineer sources was combined in order to determine the bridgehead line and objectives. River crossing doctrine, as defined in FM 5-6, Operations of Engineer Units, (9) lays

out the methodology for doing so. It states that the assaulting force should have three objectives--to eliminate effective direct small arms fire upon the crossing sites, to protect the bridge sites from ground-observed indirect fires which could be supported by artillery from the near side of the river, and to protect the bridge site from all indirect fire and to provide sufficient maneuver space on the far shore for build up of combat power.(10) This is the arc over which the corps demarcated the bridgehead line on the overlays. The divisions then took the corps bridgehead line and developed their objectives within it.

The best example of a division implementing the corps bridgehead guidance lies in the Eighth Infantry Division's Field Order Number 25 (accompanied by an overlay), 9 February 1945, for the Roer River crossing.(11) The order explicitly states the objectives each unit was to take:

o 28th Infantry Regiment. "Force crossings within zone of action, seize objectives 281, 282, 283 & 284, and protect right flank of division. Send attacking force to seize objective 282 immediately after crossing river. Maintain contact with 13th Infantry Regiment on the left (north)."(12)

o 13th Infantry Regiment. "Force crossings within zone of action, seize objectives 131, 132, & 133. 13th Infantry (less attachments) be prepared for attachment to 3rd Armor Division upon division order [for

the purpose of conducting an exploitation]. Maintain contact with 413 Infantry on left (north) and 28 Infantry on right (south)." (13)

o 121st Infantry Regiment. "Be prepared to follow 28 Infantry Regiment across river on div order. Send liaison and recon parties with both assault regiments and be prepared to pass through either assaulting regiment on div order. If committed to action, necessary attachments will be made." (14)

o General. "Enemy between Roer River and initial objectives will be completely cleared out to prevent small arms fire and close observation on bridge sites." (15)

At this point commanders could select crossing sites which best supported maneuver plans. But the best crossing sites were not always best for maneuver, so trade-offs had to be made. Unfortunately, none of the references discuss how these trade-offs were made or how they affected the operation. However, in the Roer River zone, the extensive flooding of the river greatly narrowed the choice of suitable crossing sites. Many otherwise good sites were underwater or were flanked by inundated or soggy fields. Therefore, the most accessible and trafficable sites were where bridges had formerly stood. These were the sites the planner almost invariably chose. (16)

In one instance, after selecting the sites, practically all leadership of the 1104th Engineer Combat Group involved in the Roer River crossing made aerial

flights along their zone. They paid particular attention to the portion of the river (and its crossing sites) in which their particular assignment lay.(17) This overflight accomplished two things--it acquainted each leader first hand with his portion of the river, paying attention to the terrain of his crossing site; and it aided OPSEC by not sending personnel directly to the crossing sites on the ground where the enemy could observe them.

At this point the corps then designated its bridgehead line, being sure to allow for protection of the bridge sites from indirect fire and to provide sufficient room for the build up of combat power. The line was then issued to the divisions who developed their objectives within the bridgehead line and chose crossing sites. In order to be more effective, the supporting corps engineers were integrated into the division crossing planning and joined in reconnaissance of the crossing sites. All of these actions set the stage for the development of the field order and its annexes.

Development of the Field Order and Associated Annexes

The various paragraphs and annexes to the field order (what we call "Operations Order/Plan" today) was then written by the division staff. As a minimum, annexes included--

- o An engineer support annex.
- o A fire support annex.

- o A traffic control annex.
- o A security and deception annex.
- o A logistic support annex.

If SOPs were sufficient, then the annex would simply consist of LOIs augmenting the SOP so that it could be adapted to the current situation. (18)

Engineer Support Annex. The Eighty-Fourth Infantry Division developed an excellent example of an engineer support plan for their sector of the Roer River. There, as was normal for most crossings, the divisional combat engineer battalion took responsibility for getting the assault force across while the direct support (DS) combat engineer battalion from the supporting combat engineer group had responsibility for bridge construction. The Eighty-Fourth Division field order gave B Company and the First and Second Platoons of A company, 309th Combat Engineer Battalion (Divisional), the responsibility of operating the assault boats and providing engineer guides. C Company, of the 309th, was made general support (GS) to the crossing and was told to be ready to assist where needed within 15 minutes. The company was also to cross the first vehicular bridge opened and clear all obstacles on the far shore. (19)

The direct support battalion, the 171st Combat Engineer Battalion, was given the following missions:

- o A Company was to put in three infantry foot bridges, with construction to start at H-hour; and one

infantry support bridge, with construction to start at H+1/2.

o B Company was to put in two floating treadway bridges, with the approach work to start at H hour and bridge construction to start at H+2.5.

o C Company was to construct one bailey bridge, with the approach work to start at H+1.

Construction was to start as soon as direct fires were eliminated. (20)

Since the Eighty-Fourth Division was the only division in the Ninth Army to cross on a one-battalion front, it was the only one having enough assault boats. The other divisions had to shuttle or ferry their assault waves. (21)

In preparation for the crossing, on D-2 the foot bridges and the infantry support bridge were pre-positioned under cover 150 yards from the riverline. At H-3.5, the foot bridges were moved up to the riverline under cover of darkness and positioned so they would not be in the way of the assault boat lanes. (22)

Engineers in the Eighth ID sector also prepared for the crossing. They first swept all roads in the sector for mines, thus ensuring the maximum number of roads would be available for the traffic network. Road maintenance received high priority (the February freeze-thaw cycle had been hard on the roads as mentioned earlier) to ensure that they would be able to handle the projected loads and

volume. In addition, the engineers cleared paths to the riverline (under cover of darkness) for the assault force. To improve the road net, they constructed timber trestle and bailey bridges across the small streams and canals which paralleled the Roer. (23)

In another sector, the engineers were also making provision for road repair since they anticipated that the roads would be receiving heavy traffic amid enemy shellfire. Several hundred yards of crushed rock were thus shipped by rail as far forward as possible and trucked to a dump for repairing approach roads. (24)

The engineer work for the Eighth Division assault was divided as follows:

12th Engineer Battalion

2 platoons of engineers DS to 13th Regiment
2 platoons of engineers DS to 28th Regiment
Build and operate two ferries
Build four footbridges

1120th Engineer Combat Group

Build two infantry support bridges
Build two treadway bridges (25)

Build one bailey bridge (26)

Thus, the engineer annex assigned tasks to both the organic and supporting engineers. These tasks covered the preparation of the division area for the crossing and the support tasks required for the crossing itself. Among the most commonly assigned tasks to divisional engineers were--

- a The ferrying of the assault wave.

- o The accompanying of the assault wave to the far shore to provide obstacle and road clearing support.
- o The construction of foot bridges.
- o The construction and operation of ferries.

Tasks most commonly assigned to corps engineers supporting the division were construction of the bridges and maintenance of the road net.

Fire Support Annex. The fire support plan included the task organization of the artillery and the units to which they gave DS and GS support. The plan also gave instructions as to how much ammunition would be available. The orders to the Eighth Infantry Division Artillery were as follows:

1. Support attack initially from present positions.
2. 28 FA BN reinforce 43 FA BTRY (organic to 13th INF REGT).
18 FA BN reinforce 45 FA BTRY (organic to 28th INF REGT).
56 FA BN (GS)
188 FA BN (GS)
3. The following are available to division artillery for secondary missions:
445 AAA AW BN
644 tank destroyer BN
740 tank BN
4. Be prepared to mass successive maximum fires on division objectives.
5. Initiate recon and be prepared for early displacement to east of Roer River of at least two light and one medium battalions.
6. Be prepared to support elements of 3rd A.D. in Our zone when latter is committed. (27)

Since the Roer River crossing had originally been scheduled for 10 February but was delayed until 23 February, there was time for ammunition to be brought up and stockpiled. This had the effect of changing the situation in the Ninth Army sector from one of rationing artillery rounds to one where each gun received twice its basic load to fire. (28) Also in the Ninth Army sector, the Eighty-Fourth Infantry Division (as the corps main attack) was augmented with the division artillery of the Ninety-Fifth Infantry Division (army level reserve) and the 208th FA BN. This gave the Eighty-Fourth Division nine battalions of artillery with which to conduct its attack. During this preparation time, the Eighty-Fourth Division's artillery conducted registration and targeting activities, using their organic aviation assets whenever weather permitted. They also fired numerous harassing and counterbattery missions. (29)

Thus, the fire control annex prepared the division for the crossing by--

- o Task-organizing the artillery for massed fire support.
- o Setting forth the amount of ammunition available per tube.
- o Integrating direct-fire weapons into the fire support plan.
- o Directing the forward displacement of the artillery as soon as feasible.

- o Giving instructions regarding initial targets.

Traffic Control Annex. Traffic control and the traffic control plan received heavy emphasis during the river crossings. The doctrine for the period, laid out in both FM 5-6 (mentioned earlier) and FM 101-15, Traffic Circulation and Control, (30) adhered to the principle that any traffic control plan had to meet the needs of three criteria:

- o Maneuver.
- o Supply.
- o Evacuation. (31)

Field Manual 101-15 also gave excellent doctrinal guidance outlining the requirements of a traffic control plan and its planning phases. (32) Figure 4 illustrates the doctrinal organization and staff responsibilities for traffic control as laid out in that manual. (33)

The salient points of the Eighty-Fourth Infantry Division's traffic control system were as follows:

A. Set up a vehicle prioritization system.

- 1st - Engineers
- 2nd - Crossing regiment (including support)
- 3rd - Second regiment to cross
- 4th - One battalion of artillery
- 5th - Approximately 50 trucks from division trains
- 6th - Division artillery
- 7th - Tank battalion

B. Traffic control officer was from G-4 but worked out of G-3 to be closer to the tactical priorities.

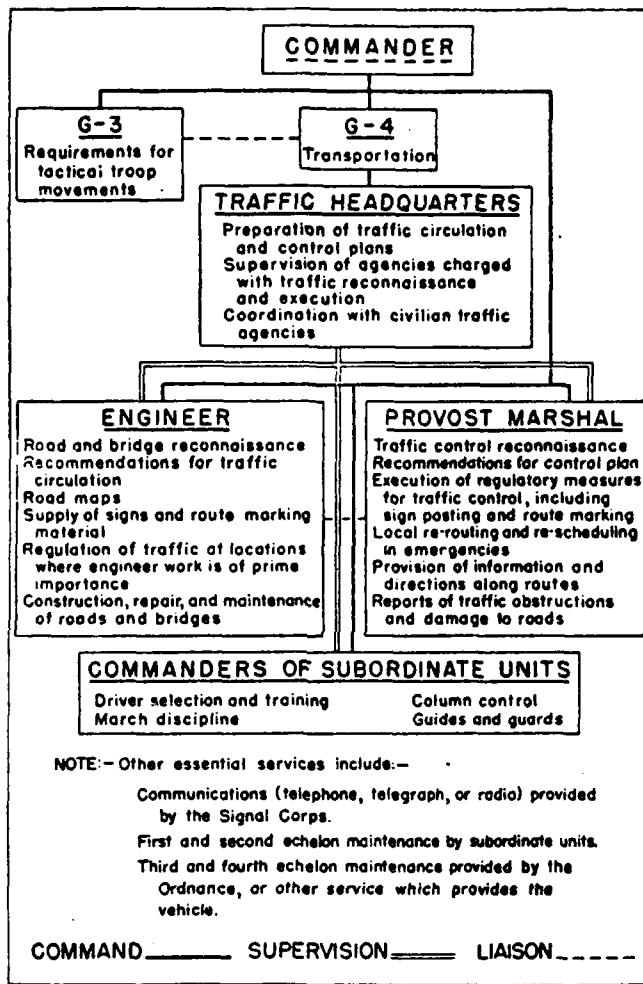


Figure 4. Doctrinal organization and staff responsibilities for traffic control.

C. MP OIC was stationed at the bridge site, close to the engineer, who then kept him apprised of approximate opening time. MP could then notify traffic control officer who issued warning orders to respective units.

D. Special traffic control measures taken:

- One way traffic.
- Two lanes. Left lane light vehicles, right lane heavy vehicles (corresponding to the light and heavy bridges being put in).
- Broken vehicle mercilessly shoved off the road or bridge. Wreckers and bulldozers pre-positioned for that purpose.
- Traffic guides at all important points, each with a telephone.
- Traffic control communication system given its own wire net.[sic](34)

The importance of having a traffic control net with its own wire system was validated by the success it helped give operations. However, this success was not without its frustrations. In the Eighth Infantry Division signal officer's after-action report, he notes with great acerbity that the division's own supporting tanks caused most of the wire communications failures. These failures totaled 137 for the month of February 1945 and required an average of 1.5 hours to find and repair. This underscored the importance of using the proper technique to string and tag wire. (35) COL. Miller thought he had his wire net redundancy well covered by having a primary and two alternate wires running from his group TAC CP. However, all three were shot out, and he then had to use messenger and radio.(36)

The G4 of a division in a sister corps had the following comments to offer about his units' traffic control experience at the Roer:

The crossing of vehicles over the Roer River was controlled by a division traffic control station and traffic regulating points. They were connected by radio and telephone, and no transportation was permitted to leave the regulating points until called for by the control station. The control station was manned by the division provost marshal, the executive officers of the two assault regiments, and an artillery representative. Each had a priority list for the crossing of the vehicles in his unit and was responsible for directing their crossings. Unit commanders made any desired changes through these representatives. (37)

Security and Deception Annex. Security and deception were recognized as very important factors in a successful crossing operation. Even though it was virtually impossible to conceal the fact that a river crossing was going to take place (since the tactical situation made it obvious), it was possible to conceal the date, time, exact location, size of the force, its intent, and whether it was a primary or supporting attack.

Signal security did a good job. During the planning and preparation phase in the crossing of the Sauer, the Eightieth Infantry Division used a wire net and messengers to pass all operational traffic. This security ruse deprived the enemy of being able to preempt the crossing. (38)

Deception plans also called for artillery and smoke. The Eighty-Fourth Infantry Division contrived a clever ruse to fool the enemy as to the time of the attack. In D-2 the infantry fired an artillery and smoke concentration onto the actual assault sites. On D-1 they

fired an artillery concentration on bogus sites and smoked the entire river in their sector. When the artillery and smoke concentrations were brought back to the actual crossing site on D-Day to prepare the way for the crossing, the enemy was caught surprised and unprepared. Prisoners stated that our artillery preparation on D-Day was not considered a signal for the crossing because of the similar concentrations the division had made the previous nights without any follow-on attacks. (39)

Simultaneously (and integrated into the ruse), on the night of D-1, under cover of the bogus smoke screen, the 309th Combat Engineer Battalion cleared the routes to the river and marked them with tracing tape (now known as engineer tape). Six lanes were laid out from the final assembly area to the boat group area (a distance of approximately 700 yards) and 35 lanes from the boat group area to the waterline (a distance of approximately 200 yards). (40)

The deception plan of the Eightieth Infantry Division included a demonstration. The Fifty-Third Armored Infantry Battalion (attached to the 318th Infantry Regiment) made the demonstration on the extreme right flank along the main road in that sector. It successfully drew the enemy's attention because a heavy concentration of mortar and artillery was fired onto the Fifty-Third. Thus, there was that much less enemy effort directed at the main force. (41)

The use of smoke during this portion of the war was left to the discretion of the commander. In the Ninth Army, each assaulting division (including the Eighty-Fourth Infantry Division) was directed to use smoke to screen its crossing sites across the Roer. However, in the adjacent First Army, of which the VII (US) Corps had the mission of protecting the right flank of the Ninth Army, GEN Lawton J. Collins left the decision of whether or not to use smoke up to his division commanders. (42) The Eighth Infantry Division (VII Corps) commander elected not to, feeling that the advantage gained by the obscuration would not outweigh the disadvantages to his artillery observers. (43) Overall, the value of smoke was the subject of much debate. COL Miller summed it up best:

Controversial also, prior to the crossing, was the policy on the use of smoke. In one division area continuous smoke was requested. The other division did not want it as it believed better protection was received from our unhampered artillery. 'If you can't see them, you can't hit them.' This crossing did not answer the argument. The division using smoke continuously had no ground observation available and had exceptionally bad, swampy terrain. The smoke was made by a CWS generator unit and was carefully controlled at a rather thin density. The weather was cool, damp, and a gentle breeze towards the enemy prevailed. The smoke remained near the earth in almost ideal conditions. I know from personal observation that under these conditions I did see clearly the muzzle blast of enemy artillery from an L-5 airplane. I also know that on the flat ground I could not see any great distance, possibly 100 yards. I do know smoke was an unqualified success under existing conditions [emphasis is COL Miller's own] for the division using it. I do know the other division had far greater casualties, which proved nothing as all conditions were different. However, this crossing more than any other operation convinced the Engineers of the value of a properly

controlled smoke (as to density) where conditions permitted and served as a model for the later Rhine crossing.(44)

Logistic Support Annex. The logistic support plan's purpose was to ensure that supplies reached the men who needed them. It laid out how to resupply the assault waves fighting to gain ground on the far shore prior to bridges opening (no vehicular bridges were put in in any of these crossings for at least 15 hours, and in one zone no bridge could be successfully constructed for almost five days). The plan also provided for resupply techniques upon opening of the bridges. Divisions with considerable supply experience in river crossing operations adopted a policy of building up reserves of supplies on the near shore for immediate use after the crossing. One regimental S4 felt that this materiel should be pre-positioned no further than two to three miles from the crossing site.(45)

Because the Roer River crossing was postponed, the supply stockpiles had time to be built up. In the Ninth Army sector alone, a 20-day supply of ammunition had been built up as well as over 10 days' supply of POL.(46) Each assault division in the Ninth Army was directed to carry a 5-day supply of rations and gasoline.(47) Amphibious craft ("weasels" and "alligators") were allocated to the divisions to ferry across supplies until bridges were completed and normal supply could resume. Additionally, 500 C-47 transport aircraft were to stand by loaded with enough supplies to sustain a division in combat for one

day. (48) To ensure adequate ammunition resupply of the bridgehead, the Eighty Fourth Infantry Division was to be supported by part of the three corps level truck companies set aside for that purpose. (49)

In the Sixth Armored Division sector, which was the Third Army's economy-of-force effort, the stockpiled supply situation was also good, but there was not the luxury of amphibious craft or transport aircraft. They simply shuttled supplies to the far shore in assault boats and then carried them (by hand or hand cart) to the front line of the assault force. (50)

The Eightieth Infantry Division sector was also resupplied by assault boat augmented by light aircraft. By pressing the division artillery's observation aircraft into service, small amounts of supplies (80-pound bundles) could be airdropped close to where they were needed. (51)

All of the divisions analyzed here planned for the logistic support of the operation. They used two logistic phases: (1) stockpiling prior to the assault; and (2) resupplying the bridgehead. The key to the dilemma of resupplying the far shore was early opening of vehicular bridges. If this could not be done then the answer became resupply by alternate means, such as amphibious vehicles or aircraft, since assault boats ferrying supplies were inadequate for the task.

Summarized in bullet form, the key elements and subelements of the planning and preparation for the crossing by the units studied were--

o Intelligence gathering, which included--

--Use of combat patrols to capture enemy soldiers for interrogation.

--Interrogation of PWs, line crossers, and locals for the purpose of determining enemy units, strengths, weaponry, positions, et cetera.

--Understanding the weather and its effect on terrain and trafficability.

--Using engineer reconnaissance and aerial photography to gather information on the river and its associated terrain for use in selecting crossing sites and avenues of ingress and egress.

o Selection of the bridgehead line, objectives, and crossing sites, which included--

--Choosing the bridgehead line (chosen by corps) to protect bridge sites from indirect fire and to provide sufficient maneuver space on the far shore for the build up of combat power.

--Choosing objectives within the bridgehead line (chosen by the division) to support the securing of its portion of the bridgehead line.

--Selecting crossing sites to support the maneuver plan.

o Development of the field order and associated annexes: such as--

--The Engineer Support Annex, which--

++Task-organized the engineers.

++Included tasks to both organic and supporting engineers.

++Commonly directed the divisional engineers to--

**Guide the assault wave from the staging area to the boat point.

**Take charge while in the assault boats and direct the infantry across.

**Accompany the infantry into the assault, clearing obstacles and roads.

**Construct foot bridges.

**Construct and operate ferries.

++Commonly directed the supporting corps engineers to construct bridges, both floating (light and heavy) and fixed heavy (bailey) types, and keep near-shore road net in good repair.

--The Fire Support Annex, which--

++Task-organized the artillery, including the attached assets.

++Allocated the number of rounds per tube.

++Integrated direct fire weapons systems into the plan.

++Planned for forward displacement of artillery units to keep pace with the assault.

++Set initial targets to be fired on.

--The Traffic Control Annex, which--

++Was designed to meet the needs of maneuver, supply, and evacuation.

++Allowed for a primary traffic control net by wire and an alternate by radio.

++Established a traffic control headquarters with adequate staffing.

++Prioritized vehicles for movement.

++Moved vehicles based on plan and maneuver requirements.

++Established one-way traffic and segregated traffic by light or heavy weight class.

++Provided for a removal or recovery system to immediately rid the road net or bridge sites of broken-down vehicles.

--The Security and Deception Annex, which--

++In order to preserve security, relied on wire and messengers to pass river crossing planning traffic.

++Passed routine traffic on the radio net to make the enemy think only routine operations were being planned or conducted.

++Planned demonstrations to draw enemy fires and attention from the main effort.

+Used smoke to assist the deception by concealing preparations and tactical operations.

--The Logistics Support Annex, which -

+Planned and prepared for adequate stockpiling of supplies forward.

+Relied on the opening of bridges in order to resupply fully the assault force.

+Planned alternate means for resupply of the bridgehead until bridges could be opened.

Phase II. Training in Preparation for the Crossing

The best documented training took place in the Eighth and the Eighty-Fourth Infantry Division sectors. Both divisions attributed much of their success to the detailed training done prior to the operation's kickoff. Trainers did not wait for the field order: training began on issuance of the warning order and was refined as plans coalesced.

The Thirteenth and Twenty-Eighth Infantry Regiments of the Eighth Infantry Division practiced river crossing techniques solely. The 121st Infantry Regiment, which had been designated the division reserve, practiced both river crossing techniques and street fighting techniques since it would conduct mop-up operations. (52)

The Eighty-Fourth Infantry Division's after-action report records that training began as soon as it received the warning order from Corps to cross the river. Training

and planning then proceeded simultaneously. Since the engineers acted as the operators of the crossing, they were trained first. They in turn trained the infantry on all aspects of crossing tactics and techniques, including how to safely and efficiently use the assault boats.(53) Units to be crossed by foot bridge were trained on boat use as backup. All units were rehearsed three times in daylight and once at night.(54) This thorough foresight, attention to detail, and best use of the time available made the Eighty-Fourth Infantry Division the best prepared unit of the divisions studied here.

When the Ninth Army delayed all of its crossings for two weeks, the division went into an even more intense training period.(55) (See Appendix 2 for a discussion of the reason for delay.) A training site was found that allowed two companies to practice simultaneous assault, just as was planned for the real crossing. Each assault battalion was given six opportunities to rehearse, and each rehearsal consisted of--

- o The infantry marching to the initial assembly area.
- o The march to the forward assembly area.
- o Meeting with engineer guides and formation into boat groups.
- o The march to the boat assembly area.
- o Meeting with engineer crews.

o Picking up the boat (410 lbs) and carrying it to the waterline.

o Launching the boat and assaulting to the far shore. (56)

The final training site was on the Meuse River near Vise, Belgium. The site was almost as wide as the Roer River and about two-thirds as fast. In the remaining available time, additional training was conducted on new weapons, refamiliarization training on weapons for veteran personnel, and initiation firing for new personnel. Down time was used for concentrated vehicle and weapon maintenance and for classes on sanitation and trenchfoot prevention. (57)

The amount of training and rehearsal for the Sixth Armored Division on the Our River and the Eightieth Infantry Division on the Sauer River, if any, is not recorded.

Thus, those divisions which trained did so with as much thoroughness as time allowed. Not waiting for the formal plan to be developed, they started training immediately, amending and refining their training as the plan solidified. They trained in the limited time available prior to their original assault date and, upon postponement of the crossing, began an even more vigorous, thorough, and realistic training program. The engineers trained themselves and then trained the assault forces step by step. Both forces then rehearsed together

each step of the assault from the initial assembly area to the far bank. The effects of this training paid high dividends for those units, as will be seen in Phase III.

As previously discussed, the important aspects of training done by the Eighty-Fourth and Eighth Infantry divisions were that--

- o The training began upon receiving the warning order.
- o Training proceeded concurrently with planning.
- o Engineers trained themselves first, then trained the infantry.
- o Realistic training site conditions were used with respect to river width and current.
- o Rehearsals were conducted which duplicated all the steps in the assault from infantry movement to the initial assembly area, through and including the assault of the far shore.

Phase III. The Crossing

Phase III consisted of all the activities that made up the assault crossing itself. Since the nature of the terrain and the tasks of the crossing units differed, I will present each division individually.

Eighty-Fourth Infantry Division

At H-3/4, all tubes in the division, plus those of the supporting units, began firing the artillery

preparation. Also firing, under DIVARTY's control, were the tank battalion, the tank destroyer battalion, and the antiaircraft battalion. These latter units fired direct fires onto targets on the far shore.

At H-hour (0330, 23 February), the fires were shifted back 100 yards. This was intended to allow the artillery to continue supporting the assaulting troops without greatly endangering them while still keeping the defenders' heads down. As discussed in Phase I, surprise was achieved. (58)

At H-2.5, the First Battalion, 334 Infantry Regiment (1/334), left the rear assembly area and marched to the initial assembly area, reaching it by H-2. The 1/334th reached the final assembly area at H-45, met the engineer guides, picked up the assault boats, and departed for the waterline at H-1/2. The OIC of the engineer guides was wounded enroute by enemy artillery fire and had to be evacuated. However, since the units had trained together repeatedly, control was not lost. (59)

At H-hour, the assault wave (A and C Companies, 1/334), crossed in assault boats. Simultaneously, the engineers began construction of the foot bridges. At 0345, the second wave crossed (B and Headquarters Companies, 1/334) and reached the far shore by 0405. Thus the 1/334th held a 700-yard crossing frontage on the far shore. (60,61)

Concurrently, foot-bridge construction progressed rapidly. At 0400 foot bridge number one had almost been

completed when a bypassed enemy machine-gun crew opened fire and prevented its completion. Foot bridge number two was completed at 0410 but was immediately knocked out by a loose assault boat which had drifted down from another division's sector. Foot bridge number three was also completed at approximately 0410. It was also immediately knocked out by enemy preregistered, random artillery harassing and interdiction fire which hit the foot bridge's anchor cable. (62)

The Third Battalion, 334th Infantry Regiment (3/334), was supposed to have crossed by foot bridge, but now could not. New plans were quickly made to cross using assault boats. However, the 3/334th could not locate enough boats for the crossing. Even though not a single boat used by the 1/334th was lost to enemy fire, large numbers were lost to the swift river current. In fact, the current was so strong that many engineer crews did not have the strength to make the return trip. Even when making the initial assault, boat crews found they could not make it to their assigned landing point. Instead, the force of the current swept all boats approximately 75 yards downstream.

Because of this, many boats were abandoned on the far shore. Not until 0645 could enough boats be located to enable the Third Battalion to cross. Even then there were not enough boats and troops had to be shuttled across. The entire battalion reached the far shore by 1035. (63)

Meanwhile, the 1/334th, which was supposed to wait for the 3/334th before assaulting the first objective, did not and moved out aggressively. By 0445 leading elements had finished advancing east and were turning north according to plan. This had the effect of completely confusing the enemy, who had fallen back to alternate positions. By turning north (as planned), the 1/334th did not engage these positions but instead assaulted unsuspecting enemy sister units from the flank. (64) By 0600, the 1/334th had already advanced 2,000 yards. The 1/334th temporarily halted near the first objective (the town of Korrenzig) and called for artillery prep fire. The 1/334th then entered the town at 0630 and had it secured by 0830. (65)

Foot bridge number 2 had finally been completed at 1130. Work was then cancelled on the other two. (66) The Second Battalion, 334th Infantry Regiment (2/334), crossed the bridge immediately. Thus by 1430, 23 February, the entire 334th Infantry Regiment had crossed. The infantry support bridge (maximum capacity: 2-1/2 ton truck with trailer or howitzer) had been started at 0900 and was completed and opened to traffic at 1730. This enabled much needed ammunition and other supplies to reach the bridgehead. Still needed was the larger capacity Class 40 treadway bridge. Having it in place would allow tanks to cross, giving the infantry needed armored support. Construction began at 0600 and the bridge was finished at

2030 the same day. But just as it was completed, it was strafed by enemy aircraft and eight of its floats were damaged. Ironically, this was not enough damage to close the bridge but just enough to lower its weight capacity and keep the tanks from crossing. It could not be opened to tank traffic until 1120, 24 February. (67) Some of the strafing was done by the new German jet, the ME-262. It is not recorded why US air defense guns were not able to deter the attack.

The Second Regiment to cross, the 335th Infantry Regiment, began its crossing at 1615, 23 February, and was completely across by midnight. (68) The division bridgehead was now 3-1/2 miles wide and contained two regiments with support, minus armor. Contact between flanking regiments was confused none the less. All efforts by the 334th in the center to link up with the 335th on the left or the 407th Infantry Regiment of the 102nd Infantry Division on the right were futile. However, the division accepted the risk and kept on attacking, sensing that being able to keep up the attack's momentum was worth the risk of having exposed flanks. (69)

At 0900 on 24 February (D+1), the 335th Infantry launched an attack toward Doveren and Doverhahn. The Class 40 treadway bridge which had been closed by strafing on 23 February was fully opened at 1120 and the tanks began to cross. They immediately moved up to support the assault. Thus, the division had crossed a significant part of its

combat force and gained a secure foothold on the far shore. (70) Midway through D+1, the Eighty-Fourth Division's crossing phase had been completed.

In just over one day the division had completed its assault crossing as the corps' main attack and could start its consolidation phase. Forced by the conditions of the river to go against doctrine and conduct the crossing on a narrow front (one regiment with one assault battalion), the Eighty-Fourth conducted a successful assault. Its assault force and its engineers had trained together to produce a very rapid and forceful crossing.

Training, use of deception, and use of screening smoke all combined to ensure that the assault force arrived successfully on the far shore in good order and with minimum loss of life. Furthermore, this was done in terrain which favored the defender slightly more than the attacker. Despite the losses of the foot bridges to enemy fires and floating debris, the engineers and the infantry were undaunted. Displaying a high degree of initiative and resourcefulness, they used alternate means to cross until a foot bridge and a vehicle bridge could be opened.

The engineers' level of training enabled them to conquer the swift current in good order with their floating bridges. The lead assault infantry battalion displayed great courage and initiative in not waiting when the follow-up assault battalion was delayed. This initiative and desire to keep the offensive alive was displayed again

when the assault commander took risk by accepting the open right flank and the lack of armored support and kept the drive across the German corps boundary alive.

Eighth Infantry Division

After a 45-minute artillery prep, the Eighth Infantry Division launched its attack across the Roer River two regiments abreast--the Thirteenth and the Twenty-Eighth Infantry. Both assaulted at 0330, 23 February (D-Day), with a one-battalion frontage to take their objectives. (71) At the last minute, the division commander decided against using smoke, thinking that it would hinder artillery observation and confuse infantry moving through the urban area on the far shore (the town of Duren). (72)

During the day the two regimental sectors developed as follows:

o Thirteenth Infantry. Companies E, F, I, and K and elements of Companies G and L had completed their crossing by means of assault boats and ferries. They had endured intense mortar and heavy artillery fire and were making small gains. The crossing and the attack were still progressing at the end of the day. (73)

o Twenty-Eighth Infantry. The Third Battalion assaulted across the river against light resistance and, advancing behind a rolling barrage of mortar-fired white phosphorous, had reached the edge of the woods in their sector by the end of the day. (74) The First and Second Battalions found themselves assaulting through heavy

artillery and mortar fire. Only four companies had completed the crossing by the end of the first day. (75)

The Eighth Infantry Division had the bad luck of drawing a poor piece of terrain and river to assault across. In its sector, the river current proved to be the strongest of all, while the terrain gave the enemy day-long observation of the division. Not employing smoke compounding these problems. The division also suffered from having no other division assigned to cover its right flank.

During the Thirteenth and Twenty-Eighth Infantries' assault crossing approximately 75 percent of the assault boats were lost in each wave. Some losses were caused by enemy fire but most were due to the inability of the three-man engineer crews to paddle back by themselves across the strong current. Also, some crews abandoned their boats on the far shore. The crews of boats equipped with outboard motors experienced great difficulty in starting their engines and, once started, keeping them from fouling on river debris. Although this slowed the rate of the assault, it served more to frustrate the commanders than to ruin the assault. (76)

German artillery fire was particularly heavy. The enemy continuously placed murderous artillery fire into the Eighth Infantry's sector at the estimated rate of 125 shells per hour on the first day and 200 per hour on the second. This forced the abandonment of all foot- and

float-bridge construction. (At this point, one of the Twelfth Engineer Battalion's direct support companies had been reduced to 12 men.) (77)

The 1120th Engineer Combat Group (DS to the Eighth Infantry Division) worked throughout the day constructing four bridges in the division's sector. (78) The work was continuously impeded by intense mortar and artillery fire. Construction continued and progressed much faster after dark, as the enemy lost observation and his fires thinned out to harassing fires. (79)

By the morning of 24 February (D+1), the Thirteenth Infantry completed the crossing of its foot troops through the use of ferries (80) and a just-opened bailey bridge (the first bridge completed in the division sector). (81) At the same time, the Twelfth Engineer Battalion began ferrying tanks and tank destroyers across the river augmenting those armored vehicles using the bailey bridge. These armored vehicles quickly joined their support regiments and gave weight to the attack. This ended the Eighth Infantry Division's assault phase.

Even though the Eighth Infantry Division had attacked on a wide front and had completed its assault phase within 24 hours, it was not in as strong a position as the Eighty-Fourth Infantry Division. It had not taken as many of its objectives, and it had suffered more casualties. As discussed above, this was chiefly due to having to attack on terrain which favored the defender due

to superior observation, poor luck in being assigned to cross the portion of the river which had the strongest current of any of the division sectors that day, not incorporating artillery barrages into their deception plan, and not employing smoke to screen their assault, rather only firing white phosphorous at known enemy observation points.

The success the division did have was because of its extensive prior training, the tenacious efforts of the assault understrength infantry battalions, the weak counterattacks of the enemy, and the outstanding efforts of the divisional and supporting corps combat engineers. The heavy casualties during daylight hours indicates strongly that the use of smoke and the proper clearing of fires from the bridge sites should have been mandatory steps in this river crossing.

Sixth Armored Division

The Sixth Armored Division conducted what can best be described as a nonclassic river crossing. This was because of the limited objectives the Sixth Armored Division was given by corps. The crossing was, none the less, a deliberate river crossing.

The division's reserve command had been sending engineer and infantry patrols to and across the Our River from the 2nd through the 6th of February. Concurrently, the rest of the division was occupying the rear area using the time to refit and rehabilitate after the Ardennes Campaign. On 6 February, Corps told the Sixth Armored

division to attack the high ground on the far shore of the Our and establish a bridgehead for future operations. Since the corps had only enough divisions (two) for an economy-of-force mission, this attack was actually directed at relieving pressure on the Army main attack being conducted in both the adjacent corps. If the bridgehead could be held for future operations, it would be an added benefit. (82)

In the interest of stealth, no artillery preparation was fired prior to the assault crossing. In the north, the Forty-Fourth Infantry Battalion and its supporting engineers left their assembly areas at 1900, 6 February (D-1), to pick up their boats. The boats were full of ice that had to be chipped out prior to use. The unit then carried the 410-pound assault boats by hand over approximately two miles of hilly terrain to the riverline. The unit reached the riverline at midnight. Repeated attempts to launch the boats into the swollen stream failed. The boats capsized in the swift, icy current and the crews were swept downriver, many drowning. Finally, at 0845, 7 February (D-Day), the first boat successfully crossed the stream to the far shore. By 1000, Company A (Reinforced) had crossed. Work then began on the foot bridge, but despite repeated attempts, the swift river prevailed. The enemy at this site offered little resistance as the assault force received only sporadic fires. (83)

In the south, the Ninth Battalion and its supporting engineers also left their assembly areas at 1900. At this location, the heavy assault boats and equipment had to be carried a distance of four miles over hilly terrain. They reached the riverline after midnight and had their first boat successfully across at 0345. By 0650 all of Company A was across, and it had advanced to a point 800 yards east of the town of Dahnen. At this point the enemy became alert to the threat and subjected the crossing area to severe artillery and mortar bombardment.

Soon after A Company crossed, work began on foot bridges at two sites. However, by midnight on 7 February, neither effort had met any success. Plans had been made to install a bailey bridge east of the town of Kahlborn, but this could not be started until the enemy fires onto the site had been cleared. (84)

Early on the morning of 7 February, the division commander issued the following orders to the commander of the reserve command (crossing force commander):

Continue your operations today along the following lines:

1. Unless blocked by enemy action, continue ferrying in both battalions until at least one company is across and well established in a shallow bridgehead.
2. From that bridgehead, send one or two small patrols inland with the particular purpose of selecting routes for the further advance of the battalion. This must be very stealthy so as not to give away the location of the bridgehead.

3. Concurrently, construct a foot bridge so that troops on the far bank can be reinforced, evacuated or withdrawn, and supplied by hand carriage.

4. As soon as foot bridge is in, expand the force in the bridgehead to as much of one battalion as can be employed against the objective and continue the advance by day or night. It is desirable that both battalions be ready to advance at about the same time, but it is not necessary. If one is ready long before the other, push it out.

5. Work on the main road and bridges must be carried out day and night without interruption until completed except that I do not want personnel exposed to direct fire.

6. All personnel who were employed last night must be given a chance to rest today and rotation of work parties and patrols within both infantry and engineers must begin at once. (85)

Since he still had no bridges across on 7 February, the crossing commander felt acutely the vulnerability of the troops on the far shore. Thus, he put renewed emphasis on bridge construction so that he could rush reinforcements across or conduct a hasty withdrawal should the assaulting force be subjected to a strong counterattack. Also, during the day of the seventh, the division commander supplied the assault force with flame throwers and directed them to organize into assault teams in order to better reduce the numerous (interlocking fire) pillboxes they were encountering. (86)

In the northern sector on 8 February (D+1), the engineers had finished two foot bridges. (Both were locally improvised by the engineers. One was a suspension foot bridge, and the other was an assault-boat foot bridge.) By 0945, the remainder of the Forty-Fourth Battalion crossed.

By 1030, the entire battalion was across, but soon afterward the suspension bridge took a direct hit from an incoming mortar round. That was the first reaction from the enemy to the crossing in the northern sector. The Forty-Fourth Battalion then moved out with the objective of securing the far bank as far down as the bailey bridge site so that construction of that bridge could begin. They did this by nightfall, at the same time enlarging their bridgehead to an area 1-1/2 miles deep and 2 miles wide. Work immediately began at the bailey bridge site (at approximately 1900). (87)

The Sixth Armored Division's operations were to become greatly complicated the next day (9 February). The III Corps, already conducting an economy-of-force operation, had its only other division, the Seventeenth Airborne Division, taken away. Therefore, the Sixth Armored Division was ordered to prepare to take over all of the Seventeenth's sector (south of the Sixth's sector, also along the Our River) not later than 1200 on 11 February. This effectively dashed the division's desire to break out of the bridgehead. Now it would have to further establish and consolidate the bridgehead. (88)

Meanwhile engineers of the supporting 1123rd Combat Engineer Group continued to work on the bailey bridge despite mortar and artillery fire. The enemy had registered onto the site and several engineers were killed and many others were wounded.

At 1355, 9 February (D+2), the bridge was completed. Tanks and tank destroyers immediately moved across to support the infantry on the far shore. They also joined up with the Seventeenth Airborne Division's bridgehead. Ironically, during this same day, the Our River's width decreased by one-third, the depth decreased by two feet, and the current diminished proportionately. The Sixth Armored Division had conducted its crossing during the Our River's high-flood stage. (89)

Thus in 2.5 days, the Sixth Armored Division had completed its assault crossing phase and was ready to move into the consolidation phase. If the engineers and infantry of Combat Commands A and B had used their inactive time prior to the crossing for training on fast-water assault and bridging techniques, the crossing probably would not have taken so long. As it was, the division inexpertly employed assault boats and foot bridges. They did do a good job of employing the heavy fixed bailey bridge for the assault.

Foregoing a preparatory artillery barrage, the division relied on stealth to gain time and ground before the dispersed enemy could discover the crossing. The combination of rugged terrain and lack of supporting artillery may have influenced the commander's decision. The tactic worked, as the enemy did not respond with effective fires until many hours after the start of the assault. Therefore, as discussed above, the primary

factors for the Sixth Armored Division taking over twice as long to complete its assault as the previous two divisions studied were not training for crossing a fast-water river, the extremely rugged and forested terrain, and the outnumbered but well entrenched enemy. The division's saving graces were their prior intelligence giving the enemy's emplacement and obstacle locations (as noted in Phase I of this chapter) and the enemy's inability to mount a strong counterattack.

Eightieth Infantry Division

The Eightieth Infantry Division's assault began at 0130, 7 February (D-Day), with an "intermittent" artillery preparation. This preparation was fired by the four battalions of the Eightieth Division Artillery, three battalions of the supporting artillery group, and one company each of tanks and tank destroyers. (90) (91) The division commander decided to use an artillery preparation since his division was the late-attacking division of the corps. Thus, the element of surprise was no longer his. (92)

After firing mortar smoke rounds onto likely crossing sites to draw enemy attention and fires, the Eightieth started its assault at other sites. (93) The assault began on a two-regiment front with the 318th Infantry Regiment attacking across the river in assault boats in the south and the 319th Infantry Regiment attacking in the north, also using assault boats. The 317th Infantry Regiment was held in division reserve (where

it would remain for five days). The Second Battalion of the 318th (2/318) spearheaded in the 318th sector, crossing the Sauer 500 meters north of the town of Dillengen. By 1200, 7 February, only one company had crossed because of the swift current and heavy enemy mortar fire. But, by evening the entire Second Battalion had crossed, including one company from the Third Battalion. (94)

In the north, the First Battalion of the 319th (1/319) spearheaded the assault by crossing the Sauer River 400 meters north of its confluence with the Our River at Wallendorf. Two companies and the command group reached the far bank prior to daylight. They launched an attack and moved 1,000 meters in order to occupy the high ground above Wallendorf. (95) The Second Battalion of the 319th (2/319) then sent two companies across the Our River at Hoesdorf. (96) Thus, by the close of the first day, four companies of the 319th had crossed.

On the 8th of February (D+1), the remaining two line companies of the 3/318th crossed over to link up with the 2/318th. The A/1/319th successfully crossed over in the darkness and captured the town of Wallendorf. The 2/319th was unable to maneuver on the far shore because of heavy enemy fires. (97) All through the first day, there were tremendous problems with assault boats capsizing because of the swift current and the concurrent lack of training on the boats. This problem plagued the Eightieth until the bridges were installed. (98)

On the 9th of February (D+2), the 3/318th completed crossing the Sauer, attacked through the 2/318th and advanced one mile through heavy woods. The 1/318th began to systematically reduce pillboxes on the high ground overlooking Wallendorf. The D/2/318th was able to cross over on the 9th of February to give the 2/318th the combat power it needed to continue the assault to the north. The 3/319th attempted to cross in assault boats but was unsuccessful because of enemy artillery and mortar fire. The 1/319th, the spearhead battalion, was running low on Class I and V supplies. Since no bridges were in yet, the division resupplied them by dropping 80-pound loads out of artillery spotter planes. Bridging efforts were still slowed because of river conditions and enemy artillery, mortar, and rocket fires. (99)

Compared to the other three divisions studied, the Eightieth Division's crossing was agonizingly slow. The Eighty-Fourth and the Eighth each took approximately one day, the Sixth required approximately 2.5 days to complete its assault, but the Eightieth was still nowhere near completion at those times.

Although the plan was to construct bridges as soon as the first wave of infantry was across, the engineers were unable to master the river's strong current. They tried three times to carry an anchor cable over to the far shore. Twice the current kept them from success; on the third attempt an enemy machine gun sunk their boat. Moving

to another location, the engineers constructed a bridge along the near shore and tried to float it into position. However, the current destroyed it.(100) Prior training on a similar river in the rear might have taught the engineers how to cope with such a situation, thus preventing the problems with the current.

On 10 February (D+3), the 1/318th attacked north to seize high ground east of Biesdorf. The 3/318th (plus one company of the 317th Infantry Regiment) attacked east to clear the southern peninsula at the bend in the Sauer River. It also outposted the Dillengen bridge site against snipers. The 1/319th and the 2/319th advanced slowly toward Ameldingen against heavy resistance from enemy pillboxes. The enemy was still able to put effective fires onto the bridge construction sites, preventing their completion.(101)

By this time, the engineers' continuous efforts to bridge the river had consumed so much equipment that more had to be sent for. The long trip to the rear and then back again to the front, over Luxembourg's traffic-damaged roads, further delayed the bridge-building effort.(102)

Despite all of the problems, the units were still able to advance against the enemy, and on 11 February (D+4), the 1/318th consolidated its position and mopped up the woods east of Biesdorf. The 3/318th seized high ground overlooking Bollendorf and continued to clear enemy pockets in the area southeast of Dillengen. The 2/318th attacked

northeast and captured the town of Biesdorf. The 3/319th was finally able to begin crossing the Our at 2230. (103)

On 12 February (D+5), at 0915, the 2/318th made contact with elements of the 319th Infantry, linking the two division bridgeheads. A Class 40 treadway bridge was completed across the Our at Wallendorf at 0700 enabling armored support to cross and assist the infantry and to also allow vital resupply in the quantities needed. The 3/318th joined the Fifth Infantry Division, thus linking the two corps bridgeheads. The 3/319th then completed its crossing of the Our River. (104) These actions completed the Eightieth Infantry Division's crossing phase.

Thus, after five days, the Eightieth Infantry Division completed its crossing and was ready to begin consolidation. The assault had begun with an artillery prep to soften up the already alerted enemy. The artillery prep's effectiveness in the rugged terrain is not recorded. The artillery also participated in ruses by firing preps onto likely, but unused, bridge sites in order to draw enemy attention. The division then assaulted across the river in boats. They encountered great difficulty from the current and enemy indirect fires. Engineers, untrained in putting float bridges across fast water, also experienced great difficulty and in the process consumed inordinate amounts of bridging assets. Well-placed enemy artillery and mortar fire onto the bridge sites did not help their

efforts. Because bridging was not in on time, aircraft were used to resupply the bridgehead.

This ultimately successful assault required the longest time to complete of all those studied--five days. It suffered from a raging river current; steep, rugged terrain; insufficient fast-water training; indirect fires onto the bridge sites; the limitations of foot mobility unsupported by armored; and an outnumbered but stubborn enemy entrenched in pillboxes. That the assault was ultimately successful is attributable to the tenacity and determination of the infantry (supported by the artillery) who hung on until the engineers could finally overcome their difficulties.

I have now described and analyzed all four division's assaults. I will now look at a problem common to all four--who had the authority to order the commencement of bridge construction? The field orders gave start times based on H-hour, but these were estimates based on when it was thought the assault force would have cleared enemy direct and indirect fires from firing onto the bridge sites. In actuality, the indirect fires were rarely cleared by then, or the enemy would infiltrate back in and resume direct firing.(105) Thus, conflicts arose as to when was the proper time to start bridge construction in the face of the tactical situation. The proper time, of course, became a matter of concern between the assault commander and the engineer. According to COL Miller,

Regardless of who makes the decision as to when to start, he must consider certain facts, among which are:

1. The desire for early reinforcements on the far shore, including tank destroyer and armored;
2. Vulnerability of bridging equipment. (106)

In its conclusions, the general board study took the easy way out and simply recommended that the engineer bridge commander (usually a company grade officer) should not be the one to make the decision. (107) Thus, a significant problem was found and addressed, but a decision which would guide future leaders encountering the same problem was not made.

Summarized in bullet form, the following are the lessons learned from studying the crossings of the four divisions in Phase III:

- o The doctrine of the period was followed by three of the divisions when they assaulted on a wide front. The fourth assaulted on a narrow front because of the river conditions which limited suitable crossing sites, yet it was the most successful.
- o Prior training of the infantry-engineer assault forces paid off in a much shorter crossing phase than for forces who did not train (one day versus 2.5 to 5 days).
- o Deception (daily barrages at likely sites, false smoke screens, demonstrations, et cetera) assisted in confusing the enemy.
- o Operations security (use of wire nets and messengers instead of radio) assisted in keeping information from the enemy.

o Maps overlayed with enemy emplacements (learned through intelligence sources (as discussed in Phase I, this chapter) and sent down to the small-unit level aided in the taking of objectives and the saving of lives.

o Smoke assisted in keeping down casualties and assisted forces in gaining objectives sooner.

o Fast water was more difficult to assault across than slow water; therefore, engineers needed prior experience or training to cope with it.

o Fast water caused a higher than average loss of assault boats and float bridges.

o Courage, initiative, and the acceptance of reasonable risk by the assault forces aided them in shocking and overwhelming the defenders.

o Terrain which was a combination of forested and steep compartmentalized hills favored the defender.

Superior observation over likely bridge sites also favored the defender.

o All available crossing equipment systems were used--assault boats, foot bridges, ferries, floatbridges, and fixed bridges. Some improvisation was used in order to adapt available equipment to needs.

o All crossings started by using assault boats; some then went to foot bridges and then to floatbridges. One skipped foot bridges and floatbridges and used ferries until a fixed bridge could be opened.

o Direct and indirect fires onto the bridge sites hampered or stopped bridge construction by destroying equipment and killing or injuring engineer crews. The sooner the fires were suppressed, the quicker the bridges were completed. Doctrine of the time directed that bridges would not be started until all direct and observed indirect fires were removed from the bridge sites. In all four of the divisions studied, doctrine was ignored and construction was started well prior to the suppression of fires. However, this was futile, as none were completed until fires onto their sites were suppressed and many of those started early were destroyed by the fire or were abandoned.

o Bridge construction progressed more rapidly at night than in daylight because the enemy could not place effective fires onto the bridge sites.

o The inability of the enemy to muster enough reserve forces to conduct strong counterattacks greatly aided the success of the assaults.

o Resupply of the bridgehead by alternate means in sufficient quantity sustained the assault force until the bridges could be opened.

Phase IV. Consolidation of the Bridgehead

When the divisions had the majority of their assault forces across the river, they began to consolidate their gains by mopping up by-passed resistance and assaulting their final objectives. Taken together this

constituted securing the bridgehead. According to doctrine of the time, this allowed security from major counterattack, room to place artillery and required trains, and room to maneuver.(108) I will discuss each division's consolidation actions in turn.

Eighty-Fourth Infantry Division

The division began its consolidation phase on 24 February (D+1) by augmenting the 334th and 335th Infantry divisions with a battalion each from the Thirty-Third Infantry Division (the division reserve). Thus, the Eighty-Fourth Division was consolidating its bridgehead on a front of two reinforced regiments with the intent of lengthening and broadening the bridgehead. The division's rapid advance had now greatly disrupted the enemy's ability to defend. At one point the Germans sent a company to the town of Doveren with the mission of setting up a defense. But the Eighty-Fourth Division was already in possession of the town. The German force got quite a "welcoming reception".(109)

The division continued advancing all day on the 25th (D+2), meeting varying degrees of resistance. The Germans were now showing signs of thorough disorganization. Volksturm (home guard) elements were being thrown into the regular infantry units on a piecemeal basis, often not even knowing to which unit they were assigned. Counterattacks were haphazard and uncoordinated; for three days and three nights, the 334th and 335th Infantry had been fighting and

advancing without letup. The division sensed that the enemy was weakening against its superior force and aggressiveness and that an exploitation could be accomplished. They were correct. (110)

Eighth Infantry Division

Both regiments (the Thirteenth and Twenty-Eighth), now supported by tanks and tank destroyers, continued the attack throughout 24 February (D+1). The Thirteenth Infantry Division, three battalions abreast, encountered moderate resistance in the form of small arms and mortar fire from built-up areas. (111)

The First and Second Battalions of the Twenty-Eighth Infantry used their armored support to advance toward their objectives, much hand-to-hand combat ensuing. The Third Battalion remained in a defensive position during the day because of lack of ammunition. The 121st Infantry Regiment crossed the river during the day and maintained its status as the division reserve.

In addition to operating ferries, the Twelfth Engineer Battalion's direct support companies (A Co DS to Thirteenth Infantry, B Co DS to Twenty-Eighth Infantry, C Co DS to 121st Infantry) swept the roads for the infantry, filled craters, and cleared the road net through towns. By 2400, 24 February, all three regiments of the Eighth Infantry Division, along with their supporting units, were across the Roer River. The division had significant combat

power to throw against the enemy and was progressing well after its initial difficulties.

By 0530, 25 February (D+2), the Thirteenth Infantry had seized its assigned objectives 131, 132, 133. By 0600 the Twenty-Eighth Infantry had also seized its assigned objectives 281, 282, 283. The 121st Infantry then passed through the Thirteenth Infantry and attacked to seize its assigned objectives 121 and 122 against stubborn resistance.(112) At 0900, in the thick of battle, the assistant division commander, Brigadier General Bryant E. Moore, assumed command of the division.(113) By midnight of the 25th, the division had issued orders to attack on 26 February to seize objectives 123, 124, and 126 and to then consolidate to protect the right flank of the VII Corps. (114)

By 0600, 26 February (D+3), the Twenty-Eighth Infantry had completed seizure and mop up of its portion of the corps' bridgehead.(115) This completed the Eighth Infantry Division's consolidation phase. Once again, through superior force and constant aggressiveness, the assaulting division was able to keep the enemy reeling and to set up the conditions for ending the crossing by performing an exploitation.

Sixth Armored Division

Once the Sixth's assault crossing was completed, their consolidation phase proceeded slowly (for reasons discussed in Phase III). They reorganized the three

commands (A, B, and R), and each command was assigned a portion of the new sector. To augment the division, corps attached a cavalry group and three combat engineer battalions (to be used as infantry). The division's relief of the Seventeenth Airborne Division (as mentioned in Phase III) took up the majority of the 10th, 11th, and 12th of February (D+3 to D+5). Simultaneously, the Sixth Armored Division was given a new corps headquarters, the VII (US) Army Corps. This had little effect on the division's operations or on the huge sector it was now holding. The enemy had far from given up, however, as demonstrated by the fires placed on the division's only Bailey bridge, which became weakened and collapsed. Repair work began immediately. (116)

During the period 13 to 19 February (D+6 to D+12), the division reorganized (see endnote 117) and continued to hold and defend its bridgehead.

On 15 February a field order arrived from corps headquarters which gladdened the division: it was told that it would assault out of the bridgehead on the 20th (D+13). (118) Thus, the consolidation phase was over and exploitation could begin. In this case, the division had performed a deliberate river crossing for the express purpose of putting pressure on the enemy so it could not reinforce another sector. Thus, there had been no corps bridgehead line to aim for and secure. They only had the mission to make a deliberate crossing and hold a bridgehead

for further operations. The Sixth Armored Division accomplished this well.

Eightieth Infantry Division

On 13 February (D+6), another Class 40 bridge was opened in the division sector, ensuring better access to the far shore for armored and logistic support and enabling the division rear to displace forward as the bridgehead expanded. The division spent from the 14th to the 17th of February (D+7 to D+10) tortuously expanding and consolidating the bridgehead over rugged terrain against an outnumbered but well-entrenched enemy. The tasks at hand included reducing bypassed or encircled pillboxes and attacking new objectives in a northeasterly direction toward the Prum River(119) while conquering the abominable conditions of the supply roads west of the river. This immense effort required getting men and materiel across the still swollen river.(120) The Eightieth Infantry Division slugged through their consolidation phase with dogged determination; terrain and trafficability were their prime enemies.

During Phase IV, the divisions concentrated on reaching the bridgehead line, normally by having regiments take successive objectives which had been set by division. In the case of the Eighty-Fourth and Eighth Infantry Divisions, only two days were required. The Eightieth required only two more days (total of four) which was excellent considering the difficulty of their terrain. The

longest time taken was that of the Sixth Armored Division--five days plus an additional five waiting for the exploitation order. However, this was due to its unusual role of acting as a fixing force to the enemy at its front in support of the overall corps operation.

In many cases, the reserve force was committed during this phase, usually to relieve the force which had been on the main axis of attack. In one case, that of the overextended Sixth Armored Division, corps engineers were attached to the division to act as infantry and conduct mop-up operations.

Thus, the amount of time required to secure the bridgehead varied as a function of the terrain, the weather, and the quality of the road net, not necessarily as a function of the enemy, which in all cases was weak, of inferior quality, and unable to mount a significant counterattack.

Summarized in bullet form, the significant elements of these successful consolidations were--

- o The difficulty of the terrain lengthened the time required for consolidation.
- o The continuation of the consolidation day and night kept the enemy off balance.
- o The enemy lacked sufficient strength for an effective counterattack.
- o Logistical support for all the consolidations was sufficient.

o Reserve forces were committed during the consolidation, primarily to relieve the force making the main attack but also to perform mop-up operations.

Phase V. Continuation of the Offense

Practical sense would say that a typical deliberate river crossing should attempt to culminate in either a breakout or an exploitation. However, doctrine of the time did not state that. It simply directed that the object of a river crossing was to establish one or more bridgeheads to protect the crossings of the remainder of the force. (121) In order for this to happen, the force had to build up sufficient combat power and maneuver space. Each of the studied units was successful at this but did not stop there since they also sought to exploit their success with follow-on operations.

In the Eighty-Fourth Division sector, the enemy was crumbling. Even though the division faced elements of three different enemy divisions, they knew, through prisoner interrogation and uncoordinated and haphazard counterattacks, that resistance was becoming disorganized. To capitalize on the situation and the excellent road network over the flat northern German plain, the division formed its first motorized task force of the war---Task Force Church (after the assistant division commander). It was motorized by attaching quartermaster truck companies from corps assets.

Two objectives were given to the task force--seize the area around Wegburg and be prepared to seize the area around Waldneil. The force was to jump off on the 27th of February and press hard to the first objective, going on to the second on order. It would be followed by the 333rd and 335th Infantry which who would mop up bypassed resistance. (122)

Task Force Church moved out at 0700 on the 27th of February (D+4), after a 10-minute artillery prep of the immediate route. By late afternoon, the task force had achieved both of its objectives, and the remainder of the division was mopping up in its path. That night, the 327th Field Artillery Battalion set up its headquarters in the just vacated headquarters of the Twelfth SS Corps--the headquarters which had been organizing the defense against them.

In reaching the first objective, the division traveled as far in one day as it had gone in all the previous four days. By reaching objective two, it had traveled twice as far. (123) The division had conducted an excellent exploitation and demonstrated an outstanding example of an aggressive way to end a river crossing. The division had "sensed" that the "kill" was possible and accepted the risk of an open flank in order to accomplish it.

In the Eighth Infantry Division's sector the exploitation was equally well done, if not less dramatic.

The corps planned for the Third Armored Division to perform the exploitation and designated that it pass through the Eighth Division at 0600 on 26 February (D+3). To aid its advance, corps detached the Thirteenth Infantry from the Eighth Division and attached it to the Third Armored Division, effective 2400, 25 February. The remainder of the Eighth Division attacked out of the bridgehead on 26 February to seize objectives and secure the corp's right flank. (124) This ended the Eighth Infantry Division's Roer River crossing and the securing of the bridgehead in what might be termed a fairly classic doctrinal crossing of the time.

On the 20th of February (D+13), the Sixth Armored Division broke out of its bridgehead. The attack began at 0630 on the 20th after a 20-minute artillery preparation followed by a 10-minute lull. This was done to fool the Germans in the area of the first objective into remanning their positions. (Its effectiveness is not recorded.) A one-minute, time-on-target barrage was then fired onto the first objective area. This was also the signal for the assaulting forces to jump off. Pillboxes fell in rapid succession. By the 24th the Sixth Armored Division had successfully secured a sector 12,000 meters wide and 10,000 meters deep and was on its way to exploiting its success after its somewhat nonclassic deliberate river crossing. (125)

The Eightieth Infantry Division did not have the same type of experience in breaking out of its bridgehead as did the other two infantry divisions. Corps did not pass an armored division through them, or even motorize them; rather, it directed them to continue their attack in the same direction. Corps intended for the division to destroy the enemy positions that were preventing the linking of the XII and VIII Corps bridgeheads.(126) On 18 February (D+11), the division conducted offensive operations as usual but with the satisfaction of having secured a very difficult bridgehead.(127) Thus, the Eightieth provided yet another variation of how to successfully end a deliberate river crossing.

In summary of Phase V, two of the four divisions studied culminated their deliberate river crossings either by conducting an exploitation themselves or by passing a fresh division through to do the exploitation (as in the Eighth Infantry Division passing the Third Armored Division). These exploitations had been planned for in Phase I.(128) The other two divisions continued the offensive themselves. Using well-collected intelligence and sensing that timing and combat power were right, the commanders seized the opportunity to drive the enemy back to his next major defensive line. In these historic cases, that next line was the Rhine River.

Summarized in bullet form, the lessons learned from these divisions in Phase V were--

o During Phase 1, plan for the continuation of the offensive to happen as soon as possible following the consolidation.

o Organize forces for maximum mobility if the continuation will take the form of an exploitation or pursuit.

o The goal of the continuation of the offense should be to drive the enemy as far back as possible, not allowing him the ability or destroying his ability to form a cohesive defense.

PART II. CONCLUSIONS

The only common denominator of these divisions was that they were all veteran divisions, having all entered battle soon after Normandy. Other than that, there were few similarities; their higher headquarters and missions differed, each of their situations and terrains differed, and their equipment in support differed. As COL Miller stated, "No absolutely fixed rules can be made because no two river crossings are the same." (129)

Keeping this in mind, I will now summarize the conclusions reached in the analysis of the five phases studied. This compilation will yield the framework describing the salient points which make up a successful river crossing based on the divisions studied.

Phase I. Planning and Preparation for the Crossing

Intelligence collection was very important to the units performing river crossing operations. The G2s gathered information from as many sources as possible, including the following:

o Aerial Photography. Aerial photography was used successfully for locating potential river crossing sites, associated terrain features, fortifications, emplacements, et cetera. Photos were also turned into photomosaics for use by engineer and assault leaders offering more and more up-to-date details of the crossing areas than could man.

o Patrols. Patrols were effective in verifying photographs and gathering more detailed information. The types of patrols used were--

--Combat patrols sent to the far side of the river to ambush the enemy and capture prisoners for interrogation. Under interrogation, the prisoners tended to yield valuable data on unit identification, unit boundaries, unit status, troop dispositions and equipment, and locations of defensive positions.

--Reconnaissance patrols sent out to gather specific data about the river; such as, width, depth, current, bank profile and soil type, bottom profile and soil type, avenues of ingress and egress, cover, fields of observation, upstream current controls, existing bridges, and damaged or destroyed bridges. The patrols also proved

capable of observing locations of enemy troops, obstacles, and fortifications (since they often unintentionally drew fire while performing their reconnaissance).

o Weather. Effects that weather could have on the river and its associated terrain were often severe. Heavy rain or snow melt would flood rivers making them wider and faster. The same weather turned roads and fields into quagmires under the weight of traffic. Bad weather also kept air support on the ground, both the close air type and the reconnaissance/artillery spotter type.

All of the operations demonstrated that rivers could be crossed at flood stage, albeit with greater difficulty.

Corps and division staffs became highly adept at analyzing intelligence to yield--

o The enemy order of battle with unit locations and concentrations.
o The lightly defended sectors.
o The enemy's most probable courses of action.
o The best geographic river crossing sites.
o The best avenues of approach.
o The trafficability in and out of each site.
o The map overlays which could be provided to maneuver units. The overlays would have annotated known enemy obstacles and fortifications.

The bridgehead line was chosen by corps to protect the bridge sites from indirect fire and to provide

sufficient maneuver space for the build up of combat power. Objectives within the bridgehead line were then chosen by the corps divisions. The divisions then selected those crossing sites which best supported their maneuver plan.

The divisions then published field orders with the following annexes as a minimum:

o Engineer Annex. The divisional engineers generally trained, prepared, guided, and accompanied the assault forces and in most divisions built the foot bridges. Once on the far shore, they cleared routes and assisted in obstacle reduction (mobility). Corps engineer units generally constructed the floating and fixed bridges.

The engineer plan also included engineer task organization, mission assignments to engineer units, construction start times, and equipment available. Phasing the construction of crossing assets did not adhere rigidly to the doctrine of the time (that is, boats must be first, rafting second, float bridges built next, fixed bridges built last). Rather, the planners anticipated what the tactical situation would allow and built accordingly. This allowed fixed bridges to be built before floating bridges if the situation allowed (that is, if suitable abutments or banks were available).

o Fire Support Annex. This annex usually contained the organization for preparatory fires, fire control plan, initial targets, and special support relationships. Until it crossed, the armored's firepower was frequently integrated

into the division fire support plan. It not needed for their primary role, antiaircraft guns were also integrated into the fire support plan to support the assault crossing (as during a night crossing when enemy aircraft did not have the capability to attack). Generally, the DS artillery crossed with their supported unit and GS crossed with the rest of the division.

o Security and Deception Annex. This would typically contain the plan for radio silence, false transmissions, use of wire communications instead of radio, work and movement at night, use of smoke to conceal preparations or actual attacks or to simulate feints, demonstrations to deceive the enemy, false artillery and smoke preparatory fires, and attacking and fighting at night. (Germans had come to believe that U.S. units did not like to fight at night.) All of these techniques were used to conceal the real intentions of U.S. troops, which gave a greater combat advantage. In every instance where the divisions used these techniques there seemed to be a beneficial effect.

o Logistics Support Annex. This annex contained plans for two logistics phases--stockpiling of supplies as far forward as possible and providing provisions for resupply of the bridgehead. Resupply of the bridgehead also took two forms--resupplying by alternate means until the bridges could be opened and resupplying after the bridges were opened.

o Traffic Control Annex. Doctrine of the time dictated that this annex had to meet the needs of three criteria: maneuver, supply, and evacuation. In each division, the traffic control plan was successful to the point of being more SOP than plan. Other important concentration areas included--

--Appointing the OIC of the traffic control network (generally the G4 or his assistant).

--The crossing control of staff and its location.

--The set up of a special communications net consisting primarily of wire using radio as backup.

--Traffic priorities.

--Traffic flow.

--Broken vehicle removal and recovery plan.

--Road net repair plan.

As a preparatory step, terrain familiarization by leaders and staff proved invaluable. Since almost all bridge sites were covered by fire (if not outposted by the enemy), only patrols could get close to them. General observation by all leaders was not possible; therefore, the use of photomosaics and overflights in light aircraft by as many leaders as possible proved invaluable. This allowed key personnel to adjust plans, if necessary, in light of actual conditions.

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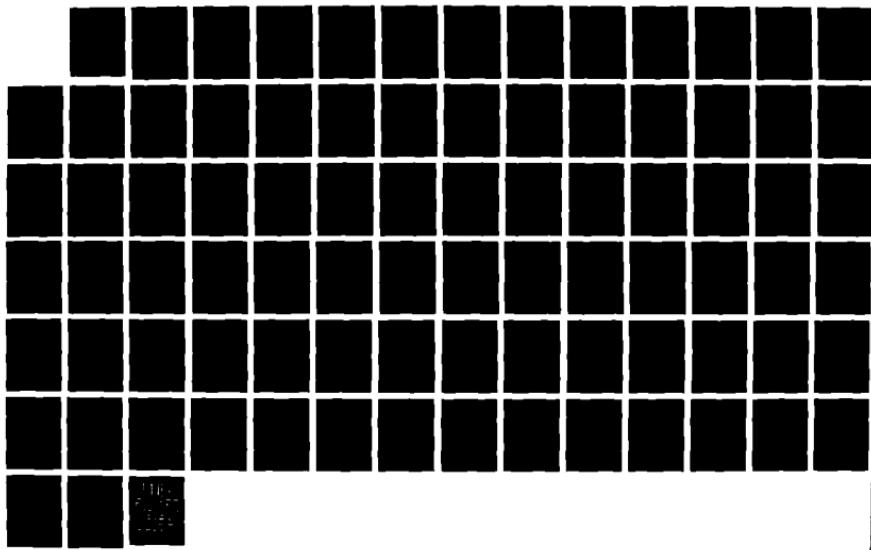
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CURRENT DOCTRINE (U) ARMY COMMAND AND GENERAL STAFF COLL
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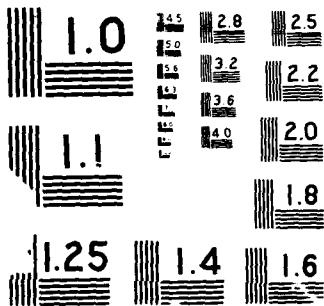
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Phase II. Training in Preparation for the Crossing

Units that underwent training prior to the crossing universally felt that it paid off. The payoff was in the form of a smoother operation with less loss of time, momentum, life, and equipment. The two divisions which had not trained (the Sixth Armored and the Eightieth Infantry divisions) required from 2.5 to 5 times as many days, respectively, to get their bridges in. This is perhaps the best testimonial to performing training prior to a river crossing if the situation permits.

In those divisions that did train, training began on receipt of the warning order from corps. Training therefore began concurrently with planning and was adjusted as the plans developed. The engineers trained themselves first in river crossing techniques, then trained the infantry. Assault training started with the basics at the individual level and then worked up to squad level and beyond, where possible. The troops were given as realistic training as could be designed. This included site and river conditions which were as close to the real thing as possible. The assault force was trained by the same engineers who would accompany them, using the same equipment they would use in the actual crossing. Rehearsals were practiced many times, taking the engineer-infantry team from the initial assembly area

through all the intermediate steps culminating in the assault of the far shore.

Again, the engineers trained themselves in raft and bridge construction. Often their training paid off in developing innovative techniques, such as preassembly of bridge components in the rear area. This allowed the bridges to be constructed more rapidly during the crossing operation while subjecting them to less exposure to enemy fire. Engineers who did not train in fast water did their divisions a disservice. Those units required 2.5 to 5 times longer to get bridges in than the ones who had practiced on fast water. Lives and equipment were needlessly lost because of this.

Phase III. The Crossing

The divisions tended to have differing philosophies concerning the use of preparatory fires. Some felt that by using them they might be giving up the element of surprise in certain situations. Others felt that if preparatory fires were used in concert with a deception plan, they were worth the effort. The Eighth and Eighty-Fourth divisions effectively used a technique which employed a preparatory barrage that struck at the shoreline and then moved back 100 yards as the assault boats took off. This had the effect of deceiving the enemy into remaining under cover. Another effective technique for the preparatory barrage was putting all indirect and direct fire systems (artillery,

tanks, tank destroyers, antiaircraft guns, under the division artillery's control. This ensured that the division's full, massive firepower came to bear on the enemy in an accurate and controlled fashion. Massing of fires using all artillery from uncommitted units, as well as all uncommitted direct fire weapons, made the preparatory fires extremely lethal.

In the end, it was the expected level of surprise that influenced the commander to use artillery preparations. Deception (daily barrages at likely sites, false smoke screens, demonstrations, et cetera, confused the enemy. If the attack was expected, the prep would be of assistance; if the enemy was unsure, then withholding the artillery prep would preserve the element of surprise.

Preparatory barrages were used to keep the enemy's heads down during the assault so that they would still be cowering while the assault force came up on them.

Prior training of the engineer-infantry assault forces and the engineer bridge-building force resulted in a much shorter crossing phase (1 day versus 2.5 to 5 days). Fast water was, of course, more difficult to cross than slow water; therefore, engineers needed training in coping with it. Fast water caused a higher than average loss of assault boats and float bridges.

Operations security (use of wire nets and messengers instead of radio for planning the assault) assisted in keeping information from the enemy.

Maps, overlayed with enemy emplacements, sent down to the small-unit level helped in taking objectives and saving friendly lives.

Not all commanders used smoke. Some felt it hindered friendly troops as much as it did the enemy; others felt it was worth the effort. Certainly, such factors as weather gradients (ability of the smoke to hold together properly), high ground available for enemy observation onto the crossing area, and the level of air threat were included in the commander's decisions. In only one instance did smoke actually prove a hindrance, and that was because the smoke was laid so thick no one could see. The most effective smoke screens were hazes which allowed visibility up to 100 yards on the ground (and more when viewed from the air to the ground). Only the Eighty-Fourth Infantry Division used smoke over its entire division assault zone, and it experienced the most successful assault of all four divisions in terms of speed of attaining objectives while minimizing loss of life and equipment.

Where it was recorded, the senior engineer officer determined the actual start time of construction (versus the planned start time) for the bridges. The commander delegated that responsibility to the engineer for the duration of the war. The engineer based his decision on

the amount and effectiveness of enemy fires onto the construction site as well as on the river's level and condition.

Traffic was usually controlled by the division G4 operating out of traffic control headquarters or collocated with the G3. In one division, the regimental executive officers assisted the C4s in controlling the regiments' movements. The use of wire nets in lieu of radio for crossing-area control was universally praised as the most efficient way to operate. Using wire lowered OPSEC problems and deconflicted the already crowded radio nets.

As would be expected, accurate direct and indirect fires tended to delay or stop construction and sometimes forced a site to be abandoned and an alternate site used. In some cases it was found that a fewer number of bridges could suffice. Another cause for bridge construction delays were enemy pockets of resistance at the riverline which had been bypassed by assault forces, but which had not been properly mopped up by follow-on forces. These pockets were able to lay effective direct fires onto the construction sites, thereby shutting them down.

Doctrine of the time was ignored in all cases as bridge construction always began prior to the suppression of fires. These premature attempts proved futile as none of the bridges could be completed until the fires onto their sites were suppressed or eliminated. In fact, many of those bridges begun early were destroyed by fire or the

site was abandoned. The sooner all the direct and indirect fires were suppressed, the faster the bridge construction went forward. Bridge construction also progressed more rapidly at night because the enemy could not place effective observed fires onto the bridge sites then.

Courage, initiative, and the acceptance of reasonable risk by the assault forces aided them in shocking and overwhelming the defenders. The inability of the enemy to muster enough reserve forces to conduct strong counterattacks greatly aided the success of the assaults.

As weak as the German Air Force was by February 1945, the few planes they could put into the air were able to damage bridges at the Roer. Thus, despite air superiority and adequate amounts of air defense equipment, enemy aircraft were not always stopped. In fact, of over 90 enemy sorties in the Ninth Army sector, only 19 aircraft were shot down.

The sooner bridges could be emplaced, the sooner armored support could reach the far shore to support the advance and thus quicken it. Bridge openings also allowed DS artillery to displace forward and much needed supplies to flow forward. Until the bridges opened, supplies had to be paddled across the river in the assault boats, rafted across, or airdropped.

Some divisions were allocated amphibious cargo vehicles to augment supply across the river until the bridges could be opened. These vehicles ("weasels" and

"alligators") proved successful in that they quickly ferried personnel, equipment, and supplies over the river and returned just as quickly for a round trip. Because of their power, speed, and cargo capacity they helped build combat power at a quicker rate than normal until the bridges opened.

Engineers learned the hard way to string floating booms upriver of their bridges. These were needed to keep floating debris, loose assault equipment, and out-of-control bridge sections and water craft from damaging or destroying their bridges.

Phase IV. Consolidation of the Bridgehead

Assault forces attacked with aggressiveness, bypassing where possible in the name of speed, shock, and surprise. The follow-on forces were tasked with mop up, but often failed to do so. While this did not directly threaten the assault force, it did threaten the bridges' completion and, therefore, the reinforcement and resupply of the assault force. Combat power (that is, armored forces and reserve battalions) was sent over the bridges as soon as there was maneuver space. Continuous logistic support was sent over in adequate amounts as needed and as space opened up.

The success of the consolidation was a factor of the force ratio, the terrain, and the roads available. Those units consolidating fastest had the advantage of flat terrain and a good road net. The enemy was of poor quality in all cases and also lacked sufficient reserves for effective counterattack. Reserve forces were committed during the consolidation, primarily to relieve the force making the main attack but also to perform mop-up operations. The consolidation was continued day and night to keep the enemy off balance. The difficulty of the terrain lengthened the time required for consolidation.

The commander was able to determine when the bridgehead was secure from the combat power on hand, the success of mop-up operations, and the enemy counterattack threat. Two of the four operations followed the consolidation with an immediate exploitation.

Phase V. Continuation of the Offense

The continuation of the offensive was planned for in Phase I and was to occur as soon as possible following consolidation. The commander of the Eighty-Fourth Infantry Division was given assets by corps to motorize a task force to accomplish this mission. The commander of the Eighth Infantry Division was ordered by corps to attach one of its regiments to the Third Armored Division and to pass the division through for the exploitation. The exploitations were successful in both destroying and keeping the enemy

from setting up another solid line of defense in front of the Rhine River. Forces were therefore organized for maximum mobility for the exploitation.

The goal of the continuation of the offense was to drive the enemy as far back as possible, not allowing him the ability, or destroying his ability, to form a cohesive defense.

ENDNOTES

(1) Oscar W. Koch, BRIG GEN. G-2 Intelligence for Patton (Philadelphia: Army Times Publishing Co., 1971), p. 112.

(2) Observer Report, ETO, August 23, 1945.

(3) G-2, IPP, pp. 76-77. The interested reader can find copies of such maps in the Map Library of the University of Kansas, Lawrence, Kansas.

(4) Charles B. MacDonald, The Last Offensive (Washington, D.C.: U.S. Government Printing Office, 1984).

(5) Hubert S. Miller, COL. Roer River Crossing (Fort Leavenworth, KS: privately printed; date unknown), inc. 6, p. 2. Currently located in the Combined Arms Research Library.

(6) H. K. Reamey et al., "Roer River Crossing Conducted by the Ninth U.S. Army, XII, U.S. Corps, and the Eighty-Fourth Infantry Division," Combat Studies Institute Battlebook Series 19-B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, June 1984), pp. 3-32.

(7) Miller, Roer River, inc. 6, p. 2.

(8) Ibid., p. 3.

(9) U.S. War Department Field Manual 5-6, Engineer Field Manual (Washington, D.C.: U.S. Government Printing Office, April 1943, with changes 1 through 6, March 1944 to January 1948).

(10) Ibid., p. 86.

(11) Field Order #25, Roer River Crossing, 9 February 1945.

(12) U.S. War Department, Twenty-Eighth Infantry Infantry Division After Action Report (Germany: February 1945).

(13) Ibid.

(14) Ibid.

(15) Ibid.

(16) MacDonald, p. 138.

(17) Miller, Inc. 6, p. 3.

(18) 8 ID FO #25.

(19) CSI, Roer, p. 11.

(20) Ibid., pp. 11-12. Crossing equipment made available for the operation consisted of--

- o 100 M2 assault boats.
- o One 432-foot foot bridge.
- o One 400-foot infantry support bridge.
- o One 532-foot M2 treadway bridge.
- o One 400-foot heavy ponton bridge.
- o One 250-foot bailey bridge, DD.
- o 2,750 life preservers.

(21) MacDonald, p. 144.

(22) Chris Bolles et al., "Assault Across the Sauer," Combat Studies Institute Battlebook Series 16-D (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), p. 11.

(23) 8 ID, AAR, p. 7.

(24) Miller, p. 22.

(25) 8 ID, AAR, FO #25, Annex 2.

(26) MacDonald, p. 161.

(27) 8 ID, AAR, FO 25, Annex 1.

(28) CSI, Roer, pp. 3-24.

(29) U.S. War Department, Eighty-Fourth Infantry Division Artillery After Action Report (Germany: November 1944 through June 1945), pp. 1, 4.

(30) U.S. War Department Field Manual 101-15, Traffic Circulation and Control (Washington, D.C.: War Department, January 1943).

(31) Ibid., p. 5.

(32) Ibid., pp. 6-7.

(33) Ibid., p. 3.

(34) 84 ID, AAR, pp. 15-16.

(35) 8 ID, AAR, p. 21.

(36) Miller, p. 22.

(37) U.S. War Department, Immediate Report 77 Combat Observations (European Theater of Operations: Headquarters, March 14, 1945), p. 2.

(38) CSI, Sauer, p. 55.

(39) 84 ID, AAR, February, pp. 13, 20.

(40) Ibid., p. 20.

(41) U.S. War Department, Eightieth Infantry Division After Action Report (Germany: February 1945), p. 3.

(42) MacDonald, p. 144.

(43) Ibid., p. 157.

(44) Miller, p. 19.

(45) OPD Information Bulletin "Assault River Crossing Experience in the ETO," summarized, Vol. IV, Number 4, 17 April 1945, pp. 7-9.

(46) CSI, Roer, pp. 3-25.

(47) MacDonald, p. 145.

(48) CSI, Roer, pp. 3-25.

(49) MacDonald, p. 145.

(50) U.S. War Department, Sixth Armored Division After Action Report (Germany: February 1945), p. 5.

(51) CSI, Sauer, p. 64.

(52) 8 ID, AAR, p. 25.

(53) 84 ID, AAR, February, p. 16.

(54) Ibid., p. 17.

(55) MacDonald, p. 143.

(56) 84 ID, AAR, p. 17-18.

(57) Ibid.

(58) 84 ID, AAR, p. 21.

(59) Ibid.

(60) Ibid.

(61) CSI, Roer, p. 4-11.

(62) 84 ID, AAR, p. 22.

(63) Ibid.

(64) Ibid. The Ninth Army's plan was to attack east across the Roer River and then swing northeast toward its objective. This, of course, meant that each of its corps and divisions had to do the same. For the Eighty-Fourth this was fortuitous since it allowed for attack across the boundary of two German Corps.

(65) Ibid., p. 22.

(66) Ibid., p. 24.

(67) Ibid.

(68) Ibid., pp. 24, 26.

(69) Ibid., pp. 24-25.

(70) Ibid., p. 26.

(71) 8 ID, AAR, pp. 27-28.

(72) MacDonald, p. 157.

(73) 8 ID, AAR, pp. 27-28.

(74) MacDonald, p. 159.

(75) 8 ID, AAR, p. 28.

(76) 8 ID, AAR, p. 10 (Engineer AAR Annex).

(77) MacDonald, p. 161.

(78) 8 ID FO 25, Annex 2.

(79) 8 ID, AAR, p. 28.

(80) Ibid., pp. 29-30.

(81) MacDonald, p. 161.

(82) 6 AD, AAR, pp. 3-5.

(83) Ibid., pp. 5-6.

(84) Ibid.

- (85) *Ibid.*, p. 5.
- (86) *Ibid.*, p. 6.
- (87) *Ibid.*, p. 7.
- (88) *Ibid.*
- (89) *Ibid.*, p. 8.
- (90) CSI, Sauer, p. 58.
- (91) 80 ID, AAR, p. 2.
- (92) MacDonald, p. 103.
- (93) *Ibid.*
- (94) CSI, Sauer, pp. 58-59.
- (95) *Ibid.*, p. 60.
- (96) *Ibid.*, p. 61.
- (97) *Ibid.*, p. 62.
- (98) MacDonald, p. 104.
- (99) CSI, Sauer, pp. 63-64.
- (100) MacDonald, p. 104.
- (101) CSI, Sauer, pp. 65-66.
- (102) MacDonald, p. 104.
- (103) CSI, Sauer, p. 67.
- (104) CSI, Sauer, p. 68.
- (105) General Board Study #72, p. 2.
- (106) Miller, pp. 20-21.
- (107) General Board Study #72, p. 7.
- (108) FM 5-6, 1943, pp. 86, 97.
- (109) 84 ID, AAR, p. 27.
- (110) *Ibid.*, p. 29.
- (111) 8 ID, AAR, p. 29-30.

(112) Ibid., pp. 31-32.

(113) MacDonald, p. 169. MG William G. Weaver suffered his fourth in a series of heart attacks and was evacuated.

(114) 8 ID, AAR, p. 33.

(115) Ibid., pp. 34-36.

(116) 6 AD, AAR, pp. 9-11.

(117) Ibid., p. 12. On February 13-19, the division reorganized into the following configuration:

o Combat Command A (in the South)

15th Tank Bn
69th Tank Bn
41st Cav Recon Sqdn (Attach)
603rd Tank Destroyer Bn (-)
1252nd Engineer Combat Bn
184th Engineer Combat Bn
A Btry, 777 AAA AW Bn

o Combat Command B (in the North)

9th Armored Infantry Bn
44th Armored Infantry Bn
50th Armored Infantry Bn
86th Cav Recon Sqdn
68th Tank Bn
284th Engineer Combat Bn
Company, 603rd Tank Bn
Company, 23rd Armored Engineer Bn
B Btry, 777 AAA AW Bn

o Reserve Command

25th Armored Engineer Bn (-)
777th AAA AW Bn (-)

o Division Artillery

128th Armored FA Bn
212th Armored FA Bn
231st Armored FA Bn

(118) Ibid., p. 13.

(119) 80 ID, AAR, pp. 8-9.

(120) MacDonald, p. 106.

(121) FM 5-6, 1943, p. 85.

(122) 84 ID, AAR, p. 31. Task Force Church was task-organized as follows:

Command Group, Task Force Church
771st Tank Battalion
(Company A, 334th Infantry, riding on the
lead tanks)
Company A, 638th Tank Destroyer Battalion,
Reinforced
Command Group, 334th Infantry
1st Battalion, 334th Infantry (minus Company A)
(Motorized)
2nd Battalion, 334th Infantry
3rd Battalion, 334th Infantry (Motorized)
Special Units, 334th Infantry
84th Reconnaissance Troop (-)
Company B, 309th Engineer Combat Battalion
Cannon Company, 334th Infantry
326th Field Artillery Battalion
Battery D, 557th AAA AW Battalion
Company B, 309th Medical Battalion

(123) Ibid., pp. 32-35.

(124) 8 ID, AAR, pp. 35-37.

(125) 6 AD, AAR, pp. 14-16.

(126) MacDonald, p. 106.

(127) Ibid., pp. 106, 113. On February 21, the CCB
of the Fourth Armored Division was attached to the Eightieth
Infantry Division and the two broke through enemy defenses
at Sinspelt.

(128) MacDonald, p. 143.

(129) Miller, p. 23.

CHAPTER 4

DESCRIPTION OF CURRENT RIVER CROSSING DOCTRINE AND COMPARISON WITH HISTORICAL EXAMPLES

Chapter 4 is divided into two parts. Part I describes current U.S. Army river crossing doctrine. Part II compares that doctrine to the four historical examples to determine if the doctrine is historically sound.

PART I. CURRENT RIVER CROSSING DOCTRINE

The U.S. Army's current river crossing doctrine is contained in FC 90-13, Counterobstacle and River Crossing Operations(1); which focuses on the combined arms operations needed to counter and cross major obstacles and obstacle systems. Part One of the FC addresses all counterobstacle operations generically. Part Two provides planning procedures for counterobstacle operations for the major types of obstacle systems. Part Three addresses execution of counterobstacle operations.

A welcome addition to any such manual is the discussion in Chapter 1 of the tenets of AirLand Battle doctrine as they apply to mobility operations. Chapter 1 also contains a good discussion of Soviet defensive

tactics, including their likely methods of obstacle and riverline defense.

Chapter 2's definition of a deliberate river crossing is the same in this manual as in the older FM 90-13:

A deliberate river crossing is required when a hasty crossing is not feasible or has failed, or when offensive operations must be renewed at the riverline. (2)

The manual lays out the fundamental requirements of counterobstacle and river crossing operations as--

- o Detecting.
- o Reconnaissance and recording.
- o Suppressing.
- o Securing.
- o Obscuring.
- o Reducing.
- o Marking and reporting.
- o Passing through or over.
- o Clearing. (3)

In discussing command and control, the FC says that the overall force commander will normally delegate responsibility for the counterobstacle operation, which would allow him to concentrate on the overall scheme of maneuver. The commander responsible for the counterobstacle operation is called the crossing force commander (CFC). At division level the CFC will normally be the assistant division commander for maneuver. (4)

The CFC normally divides his area of control into crossing areas. In a division operation, the brigade executive officers will usually be appointed as crossing area commanders (CAC) for the brigade zones. Each CAC will control--

- o Support forces such as medical or recovery elements.

- o Control elements (primarily MF) that control crossing units in the crossing area.

The manual contains a very good wiring diagram which seems to lay out the players in command and control of the crossing. However, this diagram is misleading because it is actually meant as a guide to signal corps personnel for designing the communications nets for a crossing. The diagram should be retitled or replaced before the FC is published as an FM.

The manual discusses deception completely. It describes the objectives of the deception effort as--

- o Concealing the location and strength of force build up for the operation.

- o Concealing the location of the proposed crossing and, within it, the main effort.

- o Causing the enemy to reveal his defensive fires.

- o Causing the enemy to shift his fires from the main effort.

- o Causing the enemy to commit reserves improperly against the bridgehead or to delay commitment of reserves. (5)

The manual also describes the primary missions for fire support in a crossing operation as--

- o The destruction and suppression of enemy direct and indirect fire weapons.

- o The isolation of the bridgehead area.
- o Providing interdiction fires, particularly against the movement of enemy reserves.
- o Providing illumination and smoke.
- o The suppression and destruction of enemy air defenses and command and control facilities.
- o The delivery of Family of Scatterable Mines (FASCAM) to protect flanks, support defense of the bridgehead, and restrict enemy mobility.(6)

The FC recommends crossing on a wide front with multiple breach sites to reduce vulnerability to air attack. Crew-served air defense weapons would be emplaced on the near side to provide mix, early engagement, and depth on expected avenues of approach. Once the far side was secure, they would cross to provide coverage over the crossing site.(7)

To provide security for the breaching force, suppression of enemy direct fire and observed indirect fire would be essential. Using air assault's speed and surprise would avoid the often costly effort of swimming ground troops over a river.(8)

Tactical air support to river crossing operations would consist of counter air, tactical air reconnaissance, battlefield air interdiction, and close air support operations.(9)

Engineers will play a key role in the planning process and must be represented at all levels at planning

headquarters, the manual says. The assault force is normally supported by divisional engineers. These engineers should support the initial assault across the river and subsequent attacks on bridgehead objectives. Responsibility for follow-on work would normally be given to the corps engineers supporting the operation. Where corps engineers are involved, it will be common for the senior corps engineer to be the crossing force engineer (CFE). The CFE will advise the CFC and coordinate engineer support for the crossing. This will release the divisional engineers to concentrate on support to the overall scheme of maneuver. Engineers conduct countermobility operations to protect the flanks of the operation and to support defense of the bridgehead. The FASCAM may be widely used for this mission. Engineers will also support maneuver and fire support elements in the support force and in the bridgehead by digging survivability positions and clearing fields of fire. (10)

Military police will perform two major missions in support of river crossings--battlefield circulation control (BCC) and enemy prisoner of war operations. When providing BCC for river crossings, MPs will enforce Main Supply Route (MSR) regulations, direct crossing units to their proper locations, ensure that units move through the crossing area on schedule, and disseminate information that will assist in control of the crossing unit. Traffic control will be

conducted through traffic control posts, mobile patrols, and temporary signs.(11)

Intelligence support will consist of intelligence preparation of the battlefield and participation in deception operations.

Commanders will have to place special emphasis on signal security and electronic countermeasures. Initially, maximum reliance will be on wire communications supplemented by messenger to prevent compromise of deception measures. Communications will be established between the CAC and--

- o The crossing force headquarters.
- o The breaching and crossing sites.
- o The security forces.
- o The engineers.
- o The traffic headquarters.
- o The traffic control posts in the crossing area.
- o The assault, support, and follow-on units in the crossing area.(12)

Night fighting on the AirLand battlefield will give both advantages and disadvantages to the crossing force. It will allow greater opportunity for surprise, more effective deception, and will reduce the speed with which the enemy can react. It will also affect the accuracy with which the enemy can bring its weapons to bear. The disadvantages to the crossing force will be in the areas of command and control, navigation, and synchronization.(13)

The CFC should use smoke to conceal preparations for the crossing, to conceal the crossing itself, and to assist in the deception plan. (14) Field Circular 90-13 divides river crossing operations into four general phases:

- o Advancing to the river.
- o Crossing of the river.
- o Advancing from the river.
- o Securing the bridgehead. (15)

The crossing itself is conducted in three phases:

- o The assault crossing phase, in which the objective is to rapidly cross the river, clear enemy direct fire from the exit bank, and prepare the exit bank for other forces to cross.
- o The rafting phase, in which the objective is to move support across the river to the assault force in a quick and relatively low vulnerability fashion when compared to the bridging phase.
- o The bridging phase, in which the objective is to quickly move large volumes of support to the assault force (and the remainder of the division's combat power) after the threat of direct fires and observed indirect fires has been removed. (16)

Appendix A of FC 90-13 contains a step-by-step river crossing plan. The following steps are detailed with discussions and examples:

1. Obtain intelligence.

2. Develop tactical concepts and bridgehead objectives, issue the operations order with the following annexes: intelligence, overlays, fire support, engineer, crossing plan, service support.

3. Identify crossing areas and sites.
4. Evaluate crossing sites.
5. Select crossing sites.
6. Determine crossing assets.
7. Determine vehicles to be crossed.
8. Decide configuration of rafts and bridges.
9. Complete vehicle crossing capability chart.
10. Complete engineer estimate.
11. Task-organize engineers.
12. Additional considerations:
 - o Communications.
 - o Location of engineer elements.
 - o Coordination in the crossing area.
 - o Transition of the crossing area to corps control.

(17)

Field Circular 90-13 is, in general, a vast improvement over its predecessor, FM 90-13. It is less ambiguous, more detailed and specific, and does not contain superfluous diagrams and sketches as in FM 90-13. The combination of counterobstacle operations with river crossings seems to be a good idea since the two share many points in common.

The FC's only deficiency is that it lacks real-world historical examples. Such examples are readily found in history books or unit after action reports and would help illustrate such key points as intelligence gathering, deception, fire support, traffic control, assault problems, and the use of smoke, et cetera.

The manual has only one possible theoretical flaw. That is, it was written on the assumption that all river crossings are conducted by divisions only. All four examples in Chapter 3 were conducted by corps and armies. (18)

PART II. COMPARISON TO HISTORICAL EXAMPLES

Part II compares FC 90-13 to the historical examples studied in Chapter 3 to determine if current doctrine is sound. Part II uses the same framework as in Chapter 3; that is, dividing the river crossings into five phases.

Phase I. Planning and Preparation for the Crossing

Intelligence Gathering

Field Circular 90-13 covers well most of the salient points of intelligence gathering, including the collection of terrain information using aerial photography, human sources which are easily available (locals, refugees, line crossers), engineer reconnaissance, and weather sources. However, two points are not well covered. The first is the use of combat patrols. Combat patrols proved

their worth in the intelligence-gathering effort by crossing the river in order to ambush and capture enemy prisoners and materiel. Analyzed properly by trained personnel, the prisoners yielded valuable, up-to-date information on the enemy order of battle, number and status of weapons, location and condition of emplacements, morale levels, and so forth.

The second point not well covered is the development of the enemy order of battle. This important G2 function is one of the cornerstones on which the scheme of maneuver is based. Without the enemy order of battle, the G3 would not know the enemy situation nor the capabilities against which he must develop his river crossing plan.

The FC covers weather broadly, but interestingly enough, the Army's doctrinal manual specifically covering weather support for tactical operations, FM 34-81, does not cover river crossings at all.(19) The FM does discuss the effects of various weather conditions on airborne, airmobile, and amphibious operations, but not on river crossings. This is a serious omission from that otherwise definitive manual.

Field Circular 90-13 covers well all other intelligence areas that Chapter 3 discusses.

Selection of the Bridgehead Line,
Objectives, and Crossing Sites

Field Circular 90-13 discusses well the fundamental reasons for having objectives and a bridgehead line. All of the reasons hold up under historical experiences. The manual also does a good job of discussing the requirements for selecting crossing sites with their requirement to support the scheme of maneuver. Again, this is historically supportable.

Development of the Field Order
with Associated Annexes

The field order was written in a standard Army format for the time and contains much the same information as the modern five-paragraph OPLAN/OPORD. In World War II, even as today, the Army placed the detailed orders to subordinate units in the following annexes.

Engineer Annex. The historical lessons on properly using engineer support are well covered in the FC except in one case. Because divisional engineers were tasked to accompany the assault forces across the river, there was not enough manpower left to install all the bridges the division required. This meant that the supporting corps' engineer group had to take on that task as well as perform maintenance of the division LOCs. Current engineer battalion TOEs differ from those of World War II in that the divisional engineer battalion now has organic float bridging assets with the skilled manpower to employ them.

However, there will often not be enough bridging to do the job. This means that divisions will have to receive bridging augmentation from corps assets. This will often require that divisional and corps bridge units work side-by-side. Therefore, the FC should provide doctrinal guidance for the command and control of mixed divisional and corps bridge units and other engineer support assets.

Fire Support Annex. In discussing fire support the FC again closely parallels historical experience in the areas of task organization, fire control, and crossing times of DS and GS artillery. However, one unique historical technique not found in FC 90-13 is the use of all available direct fire assets to provide firepower for the assault wave. Tasking those direct fire weapons systems (armor, antiarmor, air defense) elements (who do not have active missions during the assault) to provide firepower could aid the overall crossing effort. Even the uncommitted mortars of the reserve elements should be incorporated, especially for smoke missions.

Security and Deception Annex. Security and deception historical lessons are well covered by the FC. The critical areas of radio silence, using wire nets instead of radio nets, using smoke to conceal preparations and attacks, attacking at night, and using demonstrations and ruses are also well covered. The only historical area the FC does not cover well is the use of night to cover engineer and other preparations for the crossing. Since

observation by the human eye over long distances at night is usually precluded, the enemy either loses the ability to track actions or must rely on other observation means. These other means (normally electronic) are usually susceptible to deception measures. Thus, night is the ideal time to do the preparatory work for a river crossing. This concept should be incorporated into the FC.

Logistic Support Annex. The FC also covers logistic support of the river crossing. Such important historical areas as forward stockpiling, allocation of an adequate portion of the movement priority to logistic vehicles, provision for expedient supply to the assault force on the far shore, and allocation of an adequate portion of the movement priority to logistic vehicles after the bridges open are all discussed. However, the discussion of logistics planning for the crossing could be improved by following the methodology used in the river crossings studied; that is, dividing planning into two parts--logistic support to the assault and logistic support to the bridgehead.

Traffic Control Annex. While the logistic support section of the FC adequately discusses the need for resupply priority in the movement priority, the traffic control section did not. It also did not address evacuation needs. There were three principles built into the World War II traffic control plans studied: the plan had to meet the needs of maneuver, supply, and evacuation

(both medical and mechanical). These three principles should be written into FC 90-13.

Command and control of the crossing forces is very elaborate and detailed in the FC when compared to the historical examples. Those crossings did not have crossing force commanders or crossing area commanders nor did they designate a formal crossing area using crossing area lines as specified in FC 90-13. The G4 was in charge of traffic control, assisted by the engineers and the military police, and sometimes collocated with the G3 in order to be more responsive. Refinements have been added since World War II. However, there are two areas pertaining to crossing area command and control which are misleading in the FC. Figure 2-6 seems to show command relationships but does not. It is actually a diagram showing communications flow for the benefit of signal corps personnel. The FC needs a separate diagram clearly showing what the command relationships should be. Also, the crossing site commander's position is sketched in Figure 2-6, but FC 90-13 gives no description of his duties, responsibilities, or who he works for.

An additional potential problem in the FC is that it calls for traffic to be crossed according to a timetable.(20) While a timetable is needed in order to assemble and stage the force in the proper order, the same force cannot be sent across the river strictly according to a timetable. As Chapter 3 illustrates, tactical situations

develop differently. Therefore, crossing forces and equipment based solely on a timetable would be disastrous. The traffic control headquarters must plan to use the timetable if all goes according to plan, but at the same time must remain flexible and ready to change the plan according to the developing needs of the tactical commander.

All other elements of traffic control are well covered by the FC, including what personnel should constitute the traffic control staff, the provision for adequate communications assets including wire, provisions for traffic priority and flow, and the need for flexibility of the traffic plan to allow for changes in the maneuver plan.

Phase II. Training in Preparation for the Crossing

Field Circular 90-13 mentions the need to conduct "specialized training" and the need to train rubber-boat operators and raft operators. But the FC does not talk about comprehensive training of the assault force nor is training included in the planning steps listed in Appendix A.

As was discussed in Chapter 3 of this thesis, those divisions who did not train prior to their crossing required 2.5 to 5 times longer to complete their assault phase than those divisions who did train. This is convincing evidence of the value of training to the assault

force, the assault force engineers, and the engineers tasked with bridge building. They should be trained prior to the operation under conditions which simulate the actual crossing sites. Training should begin on receipt of the warning order and concurrently with the development of the OPLAN.

Furthermore, engineers should train themselves, then train the assault force they are to support. Engineers tasked to build bridges should train on speed, simplicity, and versatility with emphasis on as much pre-positioning and pre-erection as the tactical situation allows. Rehearsals should be conducted which take the task-organized forces through the assault operation from beginning to end (staging area to assault of far shore). Strong emphasis should be made on special aspects of the operation (swift currents, nighttime operations, assaulting into an urban area). Even safety and drownproofing should be taught to minimize the loss of men and materiel. All of this should be made doctrine and written into the next edition of Field Manual 90-13.

Phase III. The Crossing

Most of the historical lessons from Phase III of Chapter 3 are well covered in FC 90-13. These include the use of preparatory fires when necessary, the use of smoke to obscure enemy observation, the elimination of enemy direct fires and observed indirect fires, the use of

expedient cargo carriers for resupply across the river, and adequate air defense measures.

However, a number of areas are not covered at all; such as, who is the individual who decides when the bridge should be constructed? As pointed out in Chapter 3, the General Officer Board (convened immediately after World War II) pointed this out as a deficiency but did not make a doctrinal recommendation. This deficiency still stands. I suggest that the decision maker should be the tactical commander of that zone or area where the bridge site is located. His engineer should act as his adviser. Only the commander knows the true tactical situation and the urgency of need for constructing the bridge. Only the engineer knows the river and bank conditions and equipment capabilities. Together they can reach a decision based on the tactical situation and engineer aspects. If warranted, the commander can delegate authority to his engineer based on confidence. This is the situation that developed in one of the corps studied in Chapter 3. (The other corps' methods of handling the situation are not recorded.)

Another area not covered adequately in FC 90-13 is that of who the CAC is responsible to. The FC states that normally it would be the brigade XO and describes the XO's duties. But it does not say if the XO is responsible to his normal commander (the brigade commander or the assault force commander) or to the CFC. Figure 2-6 of FC 90-13 does not even show an assault force commander in the

crossing structure. (As previously mentioned, Figure 2-6 was designed to be a guide to signal personnel in designing the communications net requirements for a crossing (21) but in actuality, to the unaware reader, it portrays command relationships.) The figure should be more clearly labeled and another figure developed which does portray command relationships for both inside and outside the crossing area. The lines of command and control, from the CFC down, need to be better defined and illustrated.

The third area not covered by FC 90-13 is that of adequately securing the far shore against an enemy force which has been bypassed or which has reinfiltated.

Many of the bridge-building delays described in Chapter 3 were caused by direct and indirect fires from just such enemy actions. This caused delays in construction, destruction of bridges, and engineer casualties. Measures requiring adequate security from direct and observed indirect fires after the assault force has passed through need to be written into FC 90-13.

The last area the FC fails to detail is that of protecting bridges from floating or submerged objects. In the historic examples, many bridges were lost because of debris and loose assault equipment or bridge equipment from upstream sites crashing into the downstream bridges. An additional threat (not found in Chapter 3's historic examples but never-the-less a possibility) is that of destruction by floating mines or by divers.

Recommendations to construct floating booms or other preventative devices should be added.

Phase IV. Consolidation of the Bridgehead

Consolidation of the bridgehead is well treated in FC 90-13. The assault force conducting the attack with speed and aggressiveness, bypassing resistance if possible in order to gain maneuver space and objectives, is a well-portrayed historical lesson.(22) Also well portrayed is the necessity of bringing combat power and combat trains across the river as soon as space is available. Another area well covered is the necessity to prepare to defend the bridgehead from counterattack.

The only point under consolidation needing elaboration is the necessity for follow-on forces to be given the task of performing adequate and timely mop up of bypassed forces. Bypassed forces not properly mopped up can cause needless delays, deaths and injuries, and equipment losses to bridge-construction forces.

Phase V. Continuation of the Offense

Field Circular 90-13 does not consider either breaking out of the bridgehead or exploiting from it (depending on the situation) as fundamental goals of a river crossing. These were the goals of two of the four divisions portrayed in Chapter 3 of this thesis. These were also the goals of all four of the corps headquarters.

An indication of this omission is that the FC lists only four phases for a crossing operation:

- o Advancing to the river.
- o Crossing the river.
- o Advancing from the river.
- o Securing the bridgehead.

According to these phases, the river crossing ends with securing the bridgehead. This does not preserve the offensive spirit. Only one of the divisions studied stopped after securing the bridgehead--the Sixth Armored Division. It stopped because it was directed by its corps to only establish a bridgehead, which then could be used to launch further operations at a later date. All other divisions continued the offensive, two by exploitation. Field Circular 90-13 should add a forth phase--breakout (or) exploitation (or) pursuit from the bridgehead, or simply, offensive action out of the bridgehead.

SUMMARY

Overall, the doctrine described in FC 90-13 is well founded in history when compared with the historical examples studied in Chapter 3 of this thesis. The FC has some deficiencies; however, the doctrine proscribed is fundamentally able to produce a successful river crossing. It covers the basic principles learned from the river crossings studied here, including--

- o Intelligence gathering.

- o Selection of the bridgehead line, objectives, and crossing sites.
- o Publishing a field order (or OPLAN) with annexes.
- o Laying down requirements for the organization, support, and command and control of the crossing as well as techniques for performing the crossing.
- o Giving guidance for the effective consolidation of the bridgehead.

These guidelines alone are enough, based on historical analysis, to produce a successful river crossing. However, as the comparisons of this chapter show, there are more points which should be included in the doctrine. These can best be termed deficiencies since their omission keeps doctrine from being as effective as it could be. These deficiencies should be corrected by the U.S. Army Command and General Staff College and the U.S. Army Engineer School prior to the republishing of Field Circular 90-13 or its conversion into a field manual.

The following table summarizes (for quick comparison and reference) each phase this chapter discusses. The "Yes" means that the subject is adequately treated in FC 90-13. The "No" means it is not.

Table 1. Historic Examples Compared to
Current Doctrine

<u>WORLD WAR II EXPERIENCE</u>	<u>FC 90-13</u>
<u>Phase I. Planning and Preparation for the Crossing</u>	
<u>Intelligence gathering</u>	
o Aerial photography	Yes
o Reconnaissance patrols	Yes
o Combat patrols	No
o Human sources	Yes
o Weather	Yes
o Enemy order of battle	No
o Enemy defensive positions	Yes
o Avenues of approach	Yes
o Map overlays with special data	Yes
<u>Selection of the bridgehead line, objectives, and crossing sites</u>	
o Bridgehead line	Yes
o Intermediate and final objectives	Yes
o Crossing sites	Yes
<u>Development of the field order and associated annexes</u>	
o Engineer Annex	
--Division engineers accompanying assault force	Yes
--Division of tasks between division and corps engineers	No
--Engineer missions	Yes
--Engineer task organization	Yes
--Estimated versus actual construction start times	Yes

--Mission-considered equipment available	Yes
--Nonrigid phasing of assault, rafting, and bridging	Yes
o Fire Support Annex	
--Organizing for preparation fires	Yes
--Organizing for support	Yes
--Fire control	Yes
--DS crossing with supported unit	Yes
--GS crossing with division	Yes
--Direct fire assets employed in support of fire support plan	No
o Security and Deception Annex	
--Radio silence	Yes
--Wire instead of radio	Yes
--Engineer crossing preparations at night	No
--Smoke to conceal preparations	Yes
--Smoke to conceal attacks	Yes
--Do not employ smoke universally	Yes
--Attacking at night	Yes
--Demonstrations and ruses	Yes
o Logistic Support Annex	
--Phasing of logistic support	No
--Forward stockpiling	Yes
--Allocation of portion of priority movement to logistic vehicles	Yes
--Provision for expedient supply to assault force on far shore	Yes

--Portion of movement priority resupply after bridges open	Yes
o Traffic Control Annex	
--Meets needs of three criteria:	
**Maneuver	Yes
**Supply	No
**Evacuation	No
--Control of crossing forces	Yes
--Traffic control staff	Yes
--Adequate communications assets:	
**Wire	Yes
**Radio	Yes
--Traffic priority	Yes
--Traffic flow	Yes
--Adjustments to maneuver needs and contingencies	Yes
--Road net flow	Yes
--Contingencies for repairs and blockages	Yes

Phase II. Training in Preparation for the Crossing

Training concurrent with planning No

Training prior to crossing

- o Training begins on receipt of
warning order, prior to issue
of OPLAN No
- o Engineers train assault forces on No
use of crossing equipment
- o Realistic training using actual No
equipment and similar sites
- o Rehearse Phase III as often as
possible No

o Engineers train themselves in raft No
and bridge techniques

Phase III. The Crossing

Preparatory fires	Yes
Smoke to obscure enemy observation	Yes
Ensure enemy direct fires eliminated prior to start of construction	Yes
Ensure enemy observed indirect fires suppressed prior to start of construction	Yes
Decision maker for actual start time of bridge construction	No
Command and control lines of authority clearly laid out	No
Securing the far shore against enemy reinfiltrating	No
Expedient cargo carriers used until bridges open	Yes
Protection of bridges from other than enemy causes	No
Adequate air defense	Yes

Phase IV. Consolidation of the Bridgehead

Assault forces attack with speed and aggressiveness bypassing resistance if possible in order to gain maneuver space and objectives	Yes
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Follow-on forces given mission to mop up	No
--	----

Combat power brought over as maneuver space becomes available	Yes
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Continuous logistics support	Yes
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Phase V. Continuation of the Offense

Part of doctrine	No
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Planned for in Phase I	No
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ENDNOTES

(1) U.S. Department of the Army Field Circular 90-13, Counterobstacle and River Crossing Operations (Fort Leavenworth, KS: U.S. Command and General Staff College, March 1987).

(2) Ibid., p. 2-6.

(3) Ibid.

(4) Ibid., p. 2-18.

(5) Ibid., p. 2-25.

(6) Ibid., p. 4-1.

(7) Ibid., p. 4-3.

(8) Ibid., p. 4-6.

(9) Ibid., p. 4-6.

(10) Ibid., pp. 4-7, 8, 9.

(11) Ibid., p. 4-9.

(12) Ibid., pp. 4-12, 13.

(13) Ibid., pp. 5-1, 2.

(14) Ibid., p. 5-5.

(15) Ibid., p. 7-1.

(16) Ibid., pp. 7-1 through 7-9.

(17) Ibid., pp. A-1 through A-45.

(18) Interview with LTC Hampton Conley, co-author of FC 90-13, Center for Army Tactics, Doctrine, Command and General Staff College, Fort Leavenworth, Kansas, 8 April 1987. During the conversation it was stated that in the case of the four examples studied in Chapter 3, the operations were conducted by armies or corps but were executed by divisions. The manual should therefore be reviewed from the standpoint that its assumptions need to be rethought and rewritten before it becomes a field manual.

(19) U.S. Department of the Army Field Manual 34-81, Weather Report for Tactical Operations (Washington, D.C.: U.S. Government Printing Office, August 1984). This manual should dwell in further detail on the effects of various weather conditions affecting river crossing operations.

(20) FC 90-13, 1987, p. 3-24.

(21) Conley interview, 8 April 1987.

(22) FC 90-13, 1987.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Current deliberate river crossing doctrine as set forth in FC 90-13 is historically sound when compared to the examples from the three World War II river crossings studied.

However, there are shortcomings when the two are compared which, while not detracting from current doctrine's ability to fundamentally produce a successful river crossing, should be corrected. When implemented, such corrections will make river crossing operations run smoother with less loss of men, material, and time. Such corrections should include--

- o The use of combat patrols to gather intelligence for the commander. (1)
- o Development of the enemy order of battle by the G-2 prior to a river crossing.
- o The division of tasks between divisional and corps engineers and guidelines for command and control of the corps assets supporting the divisions.
- o The consideration of the employment of direct fire assets in the fire support plan for the assault.

o Performing as much engineer and other preparatory work as possible during the hours of darkness to preclude visual observation by the enemy.

o Determining the necessity of the traffic control plan by judging if it meets the needs of the three key criteria--maneuver, supply, and evacuation.

o The need to plan logistic support in two phases--support to the preparation and assault, and support to the bridgehead. A case could be made for the addition of a third phase, support to the continuation of the offensive action out of the bridgehead.

o Defining the position of the crossing site commander. (2)

o Amending FC 90-13 to delete the requirement that forces be sent across the river strictly according to a timetable.

o That comprehensive training for a crossing begin as soon as the warning order is received.

o The training of the assault force engineers, the infantry-engineer assault force, and the bridge building engineers on their actual crossing equipment, in their task-organized condition, and under realistic conditions (including fast water if applicable) according to the time available.

o That the individual who should decide when bridge construction is to start is the tactical commander. He may delegate this authority to his engineer.

- o Prescribing in current doctrine the lines of command and control from the crossing force commander down to the lowest element in the process.

- o Securing the far shore adequately after the assault force has passed through. This would ensure that bypassed enemy pockets of resistance do not bring fire onto raft or bridge sites. It would also preclude the enemy from reinfiltrating.

- o Protecting bridges from floating and submerged destructive objects.

- o Giving forces following the assault force the task of mopping up bypassed enemy forces and positions.

- o Adding a fifth phase to the existing four phases of a river crossing which would be called "continuation of the offense."

Recommendations

From the conclusions I have drawn above, I recommend--

- o That the cited deficiencies be corrected in the next publication of the Army's doctrinal counterobstacle and river crossing manual.

- o That FC 90-13 should be augmented with historical vignettes which illustrate the recommended doctrine. These vignettes would serve to inspire the reader by showing how our Army has overcome adversity to produce successful

crossings. They would also show how certain factors could combine to produce failure, and illustrate lessons learned.

o That current doctrinal manuals be rewritten to eliminate internal conflicts. Although FC 90-13 is the primary reference for river crossing doctrine, 22 specialized FMs also discuss river-crossing specifics.

[For example, FM 5-1, Engineer Troop Operations and Organizations(3) is more restrictive than FC 90-13 in designating the overall engineer in charge of an operation in which corps engineers are supporting a division. It states,

Regardless of the seniority of the supporting engineer unit commanders, the commander of the divisional engineer battalion remains the division engineer and coordinates the engineer work in the division area through liaison with the supporting units and through recommendations to the division commander.(4)

It continues with--

The division engineer is the responsible engineer in a division river crossing operation. He is responsible for the technical plans for the crossing of the division. He determines the engineer assistance required and works closely with supporting engineer unit commanders in the coordination of the engineer support for the crossing.(5)

Field Circular 90-13 states,

Where corps engineers are involved, it is common for the senior corps engineer to be the crossing force engineer, advising the CFC and coordinating engineer support for the crossing.(6)

Another example shows how FM 5-100, Engineer Combat Operations,(7) conflicts with FC 90-13 in at least one area. For example, FM 5-100 lists the following nine functions of a gap crossing:

- * Plan.
- * Reconnoiter.
- * Prepare.
- * Deploy assets.
- * Prepare assault site.
- * Secure the far shore.
- * Provide crossing.
- * Cross force.
- * Reconstitute. (8)

Field Circular 90-13 lists the following nine fundamentals of counterobstacle operations (including river crossings):

- * Detection.
- * Reconnaissance and record.
- * Suppress.
- * Security.
- * Obscuration.
- * Reduction.
- * Mark and report.
- * Passage.
- * Clearing. (9)

Other examples exist, but these two should be enough to show that all manuals containing river crossing doctrine should be studied in detail by the responsible agencies and be brought in line with FC 90-13.

o That the weather factors affecting river crossings need to be incorporated into FM 34-81 (as discussed in Chapter 4). (10)

o That FC 90-13 should discuss command and control and the logistic functions required of a corps-level river crossing when more than one division is involved. Of the river crossings studied, all were conducted by corps with multidivision Manning; none were by divisions

independently. This is a doctrinal omission and should be rectified.

a That FC 90-13 should consider the use of fixed bridges in the assault and should list their capabilities in the equipment appendix. The bailey bridge, for all its cumbersome shortcomings (being made of heavy steel), was valuable in the historical examples for its high load-carrying capabilities. It was used as an assault bridge by one of the divisions studied because conditions for its emplacement were ideal. The ability it gave to the division to cross armor early on was of great benefit. Modern day medium girder bridges (MGB), made of aluminium and therefore lighter, are more versatile than the bailey (which is still in the inventory). Both should be considered for assault bridges under the proper conditions.

I reviewed a large number of doctrinal manuals to produce Chapter 4 of this thesis [see "Field Manuals" portion of Bibliography]. Each manual contains one obvious flaw: each is too wordy and too bulky. In contrast, FM 5-6 (1943)(11) is only 288 pages long, covers the same subjects as are covered in today's FMs 5-1,(12) 5-100,(13) 101,(14) and 90-13 combined, and fits in the breast pocket of the field uniform. Doctrine writers should once again try to produce such concise and portable manuals.

River crossings performed today, whether in ARTEP training or on an FTX, are often called tactical crossings. In actuality they are merely administrative crossings.

This is primarily because of the huge amounts of time, space, and resources required for a tactical river crossing. That we deceive ourselves into thinking we are practicing tactical crossings hurts our ability to go to war now. As a minimum, the U.S. Army should practice command and control of river crossings in the CPX mode from corps down to task force level. The U.S. Army should develop a battle simulation (board game or computer game) that would require headquarters elements to plan a crossing, set up the crossing area command structure, and conduct traffic control. The game should then be capable of simulating the assault, consolidation, and offensive out of the bridgehead.

As brought out by the general officer board study, there was always at least one corps combat engineer battalion continuously in direct support to each committed division in World War II. For this reason, the division, corps, and Army commanders comprising the aforementioned board recommended that the divisional engineers be organized into a regiment. The current "E-Force" initiative by the U.S. Army Engineer School will answer that long-dormant recommendation and do it with a net loss of manpower spaces to the active force structure. The "E-Force" initiative should definitely be adopted.

As Chapter 2 states, the two best descriptions I found of deliberate river crossings are The Last Offensive, by Charles MacDonald,(15) and Roer River Crossing, by COL Hubert S. Miller(16). Two chapters of MacDonald's book are the most meaty and therefore the

most valuable for this study. They are Chapter VI, "Bitburg and the Vianden Bulge" (river crossings in rugged terrain), and Chapter VIII, "Operation Grenade" (river crossings in gentle terrain). COL Miller's unpublished booklet is a magnificently detailed compilation of first-hand accounts of engineer problems encountered and overcome in crossing a major river obstacle. Chapters VI and VIII of MacDonald's book and all of COL Miller's booklet should be mandatory reading for the Engineer Officer Advanced Course.

In summation, those who fought World War II so valiantly and so well left us a legacy of experience which can still be applied to today's modern battlefield conditions. It behooves us, the inheritors of that legacy, to apply the lessons we have learned from history to improve our doctrine and our training so that we may be such a formidable force that no potential foe will ever want to call us onto the battlefield. Our current doctrine writers have done a good job in rewriting FM 90-13 in order to produce PC 90-13. They must now improve on their effort so that the trainers in the field can practice the methods required to successfully force deliberate river crossings.

ENDNOTES

(1)U.S. Department of the Army Field Circular 90-13. Counterobstacle and River Crossing Operations (Fort Leavenworth, KS: U.S. Command and General Staff College, March 1987).

(2)Ibid.. Figure 2-6.

(3)U.S. Department of the Army Field Manual 5-1, Engineer Troop Operations and Organizations, with Change 1 (Washington, D.C.: U.S. Government Printing Office, July 1971).

(4)Ibid., p. 3-4.

(5)Ibid., p. 6-3.

(6)FC 90-13, 1987, p. 4-B.

(7)U.S. Department of the Army Field Manual 5-100. Engineer Combat Operations (Washington, D.C.: U.S. Government Printing Office, May 1984).

(8)Ibid., pp. 6-13, 14.

(9)FC 90-13, pp. 2-7, 8.

(10)U.S. Department of the Army Field Manual 34-81, Weather Support for Tactical Operations (Washington, D.C.: U.S. Government Printing Office, August 1984).

(11)U.S. War Department Field Manual 5-6, Engineer Field Manual, Operations of Engineer Field Units (Washington, D.C.: U.S. Government Printing Office, January 1943).

(12)FM 5-1.

(13)FM 5-100.

(14)U.S. Department of the Army Field Manual 5-101. Mobility (Washington, D.C.: U.S. Government Printing Office, January 1985).

(15)Charles B. MacDonald, The Last Offensive (Washington, D.C.: U.S. Government Printing Office, 1984).

(16) Hubert S. Miller, COL. Roer River Crossing
(Fort Leavenworth, KS: privately printed; date unknown).
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APPENDIX

FURTHER DETAILS ON THE THREE SPECIFIC RIVER CROSSING SECTORS STUDIED IN THIS THESIS

Each river crossing sector will be described in terms of seven elements of information: the timeframe, the Army level plan, the troops, the corps and division missions, the river and terrain characteristics, the weather, and the opposing forces.

Starting in the north and then working south, the first river crossing sector is that of the Roer River.

Timeframe:

23 February 1945

Army Level Plan:

Assault across the Roer, drive northeast, and link up with the First Canadian Army along the Rhine River (code named "Operation Grenade"). (1)

Troops:

US Ninth Army

XVI (US) Corps

35th Infantry Division

79th Infantry Division

8th Armored Division

XIII (US) Corps

84th Infantry Division

102nd Infantry Division

5th Armored Division

XIX (US) Corps

29th Infantry Division

30th Infantry Division

83rd Infantry Division

2nd Armored Division

US First Army

VII (US) Corps

8th Infantry Division

99th Infantry Division

104th Infantry Division

3rd Armored Division (2,3,4)

Corps Mission:

XIII (US) Corps: Support Ninth (US) Army's second phase of the Roer River crossing by taking the road center of Erkelenz and clearing the east bank of the Roer to a point west of Erkelenz. (5)

Division Mission:

84th ID: 84th Infantry Division (-) (reinf) forces a crossing of the Roer River in the vicinity of Linnich to seize and secure a bridgehead in its zone. (6)

Composition of the 84th ID and Supporting Units:

333rd Infantry Regiment

334th Infantry Regiment

335th Infantry Regiment

84th Reconnaissance Troop (Mech)

309th Engineer Combat Battalion

171st Engineer Combat Battalion (DS)

309th Medical Battalion

84th Division Artillery

 325th Field Artillery Bn (105 How)

 326th Field Artillery Bn (105 How)

 909th Field Artillery Bn (105 How)

 327th Field Artillery Bn (155 How)

 557th AAA AW Bn (DS)

 95th Division Artillery (Attached)

 (4 bns)

 208th Field Artillery Bn (105 How)

 (Attached)

 C & D COs, 3rd Chemical Mortar Bn (Attached)

 638th Tank Destroyer Bn (Attached)

 771st Tank Battalion (Attached)

 784th Ordnance Light Maint Co

 84th Quartermaster Co

 84th Signal Co

 Military Police Plt

Headquarters Company

Band

74th Smoke Generator Co (Attached) (7)

Corps Mission:

Protect the right flank of Ninth (US) Army by penetrating 13 miles to the Erft River beyond the town of Elsdorf. (8)

Division Mission:

8th ID: Attack to seize crossings over the Roer River and objectives 131, 132, 133, 281, 282, 283, 284; secure corps bridgehead; and protect corps right flank. Be prepared to continue attack to northeast in zone of action. (9)

Composition of the 8th ID and Supporting Units:

13th Infantry Regiment

28th Infantry Regiment

121st Infantry Regiment

8th Reconnaissance Troop (Mech)

12th Engineer Combat Battalion

8th Medical Battalion

8th Division Artillery

43rd Field Artillery Bn (105 How)

45th Field Artillery Bn (105 How)

56th Field Artillery Bn (105 How)

28th Field Artillery Bn (155 How)

18th Field Artillery Bn (105 How) (Attached)
188th Field Artillery Bn (155 How)
(Attached)
445th AAA AW Bn (Attached)
644 Tank Destroyer Bn (-B & C Companies) (Attached)
740 Tank Bn (-A & B Cos) (Attached)
708th Ordnance Light Maint Co
8th Quartermaster Co
8th Signal Co
Military Police Plt
Headquarters Company
Band(10)

River and Terrain Characteristics:

The Roer River valley is part of the Cologne plain.

It is--

... generally flat, open country traversed by an extensive network of hard surfaced roads The only high ground worthy of the name in that part of the plain to be crossed by the Ninth Army is an egg-shaped plateau extending eastward from the vicinity of Linnich and rising no higher than 400 feet above sea level. The land throughout the plain is mostly arable and was planted predominantly in grain and stock beets. Observation and fields of fire were excellent. (11)

The Roer River itself was normally a placid stream averaging only about 90 feet wide. The level of the river could be controlled through a series of dams upstream, the most prominent of which were the Urft and the Schwammenauel.

After the failure of their counteroffensive in the Ardennes, the Germans pulled back across the Roer River.

In order to make the river a more formidable obstacle, they

damaged the discharge valves so that the dams let out a continuously heavy flow of water which systematically flooded the river valley below. (12)

Not for about twelve days would the water in the reservoirs be exhausted. Upstream from Dueren, where the river's banks are relatively high, the worst effect of the flood was to increase the current sharply, at some points to more than ten miles per hour. Downstream along most of its length, the Roer poured over its banks and inundated the valley floor. Just north of Linnich where the river is normally 25-30 yards wide, it spread into a lake more than a mile wide. More common were inundations of 300-400 yards. The ground on both sides of the flooded floor was soft and spongy. Acting on the advice of the engineers, General Simpson ... set D-day for 23 February, one day before the reservoirs presumably would be drained. Although the river still was in flood, it had receded eight to fourteen inches below the peak, and the current at few places exceeded six miles per hour. By seizing the first practicable moment when the river might be crossed with reasonable chance of success instead of awaiting a return to normal, General Simpson hoped to achieve some measure of surprise. (13)

Weather:

Cool, damp, with a gentle breeze toward the enemy prevailing.

Opposing Forces:

Because of the Canadian thrust in the north (Operation Veritable), the German forces opposing the Ninth Army sector had been stripped of many of their forces. The G2 estimated that the total enemy force consisted of approximately 30,000 men, 85 assault guns, and 30 battalions of artillery. Thus, the force ratio was about five to one in the favor of the US Ninth Army. (14)

The second river crossing sector is that of the Our River.

Timeframe:

7 February 1945

Army Level Plan:

Penetrate the "West Wall," capture the Bitburg-Pruem area, and set the stage for a drive to the Rhine.(15,16)

Troops:

US Third Army

III (US) Corps

VIII (US) Corps

6th Armored Division

17th Airborne Division

6th Cavalry Group

1123rd Engineer Combat Group

1137th Engineer Combat Group

32nd AAA AW Group

3rd Chemical Mortar Battalion(17)

Corps Mission:

The III Corps was the center left corps of Patton's four corps. It was the direct center corps of the Army's main attack by VIII Corps with the III Corps on the left and the XII Corps on the right. Since it only had two divisions (which would be reduced to one division midway through the operation), its mission was to support the two main attacks on either side of it (designed to be converging

pincers) by attacking forward (in the form of a reconnaissance in force) and putting pressure on the enemy to keep its forces from shifting to the area of the main attack. (18)

Division Mission:

6th AD was to make reconnaissance in force across the Our River during the night of 6-7 February. If a bridgehead could be maintained there, it was to establish a bridgehead for future operations to the east. (19)

Composition of the 6th AD and Supporting Units:

Headquarters Company

Reserve Command

Combat Command A

Combat Command B

15th Tank Battalion

68th Tank Battalion

69th Tank Battalion

9th Armored Infantry Battalion

44th Armored Infantry Battalion

50th Armored Infantry Battalion

86th Cavalry Recon Sqd (Mech)

41st Cavalry Recon Sqd (Mech) (Attached)

25th Armored Engineer Bn

284th Engineer Combat Bn (Attached)

184th Engineer Combat Bn (Attached)

1252nd Engineer Combat Bn (Attached)

146th Armored Signal Company

6th Armored Division Artillery

128th Armored Field Artillery Battalion

212th Armored Field Artillery Battalion

231st Armored Field Artillery Battalion

777th AAA AW Battalion (Attached)

6th Armored Division Trains

128th Ordnance Maintenance Battalion

161st Chem Smoke Gen Co (Attached)

76th Armored Medical Battalion

Military Police Platoon

Band(20)

River and Terrain Characteristics:

A thaw had set in on the first of February and most of the snow had entirely melted. The Our River was flowing at the rate of 10-15 mph, was about ten feet deep, and had swollen to several times its normal width. The approaches to the Our River were steep and the terrain was generally very rough, permitting vehicular movement only on primary and secondary roads. (21)

Weather:

Temperatures were on either side of freezing. Rain and light snow predominated. There was low cloud cover with dense fog in the mornings. (22)

Opposing Forces:

The 167 Volksgrenadier Division at approximately half strength. (23)

The third river crossing sector is that of the Sauer River.

Timeframe:

7 February 1945

Army Level Plan:

Penetrate the "west wall," capture the Bitburg-Pruem area, and set the stage for a drive to the Rhine using a four-corps front. (24)

Troops:

US Third Army

XII (US) Corps

5th Infantry Division

80th Infantry Division

76th Infantry Division

4th Armored Division (25)

Corps Mission:

Attack northeastward from Echternacht to take Bitburg. (26)

Division Mission:

80th ID: Attack 070200 February across the Sauer River. Initially assist the 5th ID (corps main attack) by seizing high ground northwest of Bollendorf. Continue to attack the northwest and north in zone to seize objective (Obj 80 Div). Maintain contact with III Corps (on the left). (27)

Composition of the 80th ID and its Supporting Units:

317th Infantry Regiment
318th Infantry Regiment
319th Infantry Regiment
51st Armored Infantry Bn (Attached)
80th Reconnaissance Troop (Mech)
305th Engineer Combat Battalion
305th Medical Battalion
80th Division Artillery
 313th Field Artillery Bn (105 How)
 314th Field Artillery Bn (105 How)
 905th Field Artillery Bn (105 How)
 315th Field Artillery Bn (155 How)
 633rd AAA AW Bn (Mbl) (Attached)
 Co A, 91st Chemical Mortar Bn (Attached)
702nd Tank Bn (- Co D) (Attached)
811th Tank Destroyer Bn (Attached)
780th Ordnance Light Maint Co
80th Quartermaster Co
80th Signal Co
Military Police Plt
Headquarters Company
Band (28)

River and Terrain Characteristics:

The terrain on either side of the river was steep gorges, in some places 600 feet high. The five-mile stretch making up XII Corps's sector was further protected

by large wooded stretches hugging the banks of the Sauer. (29)

Early February saw a thaw cycle hit the area, causing the accumulations of snow to melt. The river, at the time of the attack, was swollen to double its normal 90-foot width. The current was an extremely rapid 12 miles per hour. Thawing conditions made trafficability difficult. (30)

Weather:

Temperatures on either side of freezing. Rain and light snow predominated. Low cloud cover.

Opposing Forces:

Elements of the LIII German Corps consisting mainly of the 352nd Volksgrenadier Division. The 352nd was a polyglot unit consisting of 30 percent Army combat veterans, 60 percent Navy retrained personnel, and 10 percent Luftwaffe retrained personnel. The division had been heavily attrited during the German counteroffensive in the Ardennes ("Battle of the Bulge"). They occupied a formidable portion of the "west wall" consisting of an enormous number of pillboxes with interlocking fires. The force ratio was at least 3:1 in favor of the 80th Infantry Division. (31)

ENDNOTES

(1) Charles B. MacDonald, The Last Offensive (Washington, D.C.: U.S. Government Printing Office, 1984), p. 135.

(2) Order of Battle of the United States Army, World War II, European Theater of Operations, Divisions (Paris: Office of the Theater Historian, December 1945).

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(4) MacDonald, pp. 135-136.

(5) Ibid., p. 143.

(6) U.S. War Department, Eighty-Fourth Infantry Division After Action Report (Germany: February 1945), p. 19.

(7) Order of Battle, pp. 303-306.

(8) MacDonald, p. 157.

(9) U.S. War Department, Eighth Infantry Division After Action Report (Germany: February 1945), Field Order #25, 091300A.

(10) Order of Battle, pp. 67-70.

(11) MacDonald, p. 138.

(12) Ibid., p. 82.

(13) Ibid., p. 143.

(14) Ibid., pp. 139-140. "In late 1944, and early 1945, when [German] divisions were being mauled in both east and west, worn down divisions continued to fight as combat groups under one of the regimental commanders. The remainder of the service elements, artillery, and headquarters were returned to Germany to form a 'Volksgrenadier' division. Fillers came from the Luftwaffe and the Navy." (Walter S. Dunn, Jr. "People Policies in Combat," Parameters XIV, 1, (Journal of the USAWC: Spring 1984), pp. 49-50.)

(15) Ibid., pp. 99, 115.

(16) James McCord et al., "Our River Crossing," Combat Studies Institute Battlebook Series 16B (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), p. 15.

(17) Order of Battle, pp. 96-97, 471-474.

(18) MacDonald, p. 99.

(19) U.S. Department of the Army, Sixth Armored Division After Action Report (Germany: February 1945), p. 3.

(20) Order of Battle, pp. 471-474.

(21) 6th Armored Division, p. 3.

(22) CSI Battlebook, "Our," pp. 29, 50.

(23) Ibid., pp. 20-23.

(24) MacDonald, pp. 100, 199.

(25) Order of Battle, pp. 55-510.

(26) MacDonald, p. 84.

(27) Chris Bolles et al., "Assault Across the Sauer," Combat Studies Institute Battlebook Series 16-D (Fort Leavenworth, KS: U.S. Army Command and General Staff College, May 1984), p. 20.

(28) Order of Battle, pp. 270-272.

(29) MacDonald, p. 100.

(30) Ibid., p. 101.

(31) CSI Battlebook, "Sauer," pp. i, 22.

GLOSSARY

ACRONYMS AND ABBREVIATIONS:

-A-

AAA antiaircraft artillery
AAR after action report
AD air defense
A.D. anno domino
ARMD armored

-B-

BCC battlefield circulation control
bn battalion
btrv battery

-C-

CAC crossing area commander
CFC crossing force commander
CFE crossing force engineer
CGSC Command and General Staff College
Co company
CP command post
CSI Combat Studies Institute

-D-

DD dual drive
div division
DS direct support

-E-

EEI essential elements of information
ETO European Theater of Operations

-F-

FASCAM family of scatterable mines
FC field circular

-G-

GS general support

-H-

How howitzer

-I-

ID infantry division
Inf infantry

-L-

lbs pounds
LOC lines of communications
LOI letter of instruction

-M-

MP military police
MSR main supply route

-O-

OIC officer in charge
OPLAN operations plan
OPSEC operations security

-P-

POL petroleum, oils, lubricants
PW prisoners of war

-R-

recon reconnaissance
regt regiment

-S-

SOP standing operating procedure

-T-

Tac tactical
TOE table(s) of organization and equipment

-U-

US/U.S.
USFET United States
U.S. Forces, European Theater

-W-

WWI World War I
WWII World War II

-X-

XO executive officer

DEFINITIONS:

All definitions are taken from FM 101-5-1 (October 1985). unless otherwise noted.

Air Assault -- Operations in which air assault forces (combat, combat service, and combat service support), using the firepower, mobility, and total integration of helicopter assets in their ground or air roles, maneuver on the battlefield under the control of the ground or air maneuver commander to engage and destroy enemy forces.

Air Defense -- All measures designed to nullify or reduce the effectiveness of an enemy attack by aircraft or guided missiles in flight.

Area of Operations -- That portion of an area of conflict necessary for military operations. Areas of operations are geographical areas assigned to commanders for which they have responsibility and in which they have authority to conduct operations.

Artillery Preparation -- Artillery fire delivered before an attack to disrupt communications and disorganize the enemy's defense.

Assault Forces/Wave -- The major subordinate units conducting the assault to, across, and beyond the water obstacle.

Assembly Area -- An area in which a force prepares or regroups for further action.

Avenue of Approach -- An air or ground route of an attacking force of a given size leading to its objective or to key terrain in its path.

Battlefield Circulation Control (BCC) -- A military police mission involving route reconnaissance and surveillance, main supply route (MSR) regulation enforcement, straggler and refugee control, and information dissemination.

Boundary -- A control measure normally drawn along identifiable terrain features and used to delineate areas of tactical responsibility for subordinate units.

Breakout - An offensive operation conducted by an encircled force. A breakout normally consists of an attack by a penetration force to open a gap through the enemy for the remainder of the force to pass.

Bridgehead - An area on the enemy's side of the (water) obstacle that is large enough to accommodate the majority of the crossing force, has adequate terrain to permit defense of the crossing sites, and provides a base for continuing the attack.

Bridgehead Line - In offensive river crossing operations, the limit of the objective area when developing the bridgehead.

Combat Power - A complex combination of tangible and intangible factors which are transitory and reversible on the battlefield. Combat power is comprised of the effects of maneuver, the effects of firepower, the effects of protection, and the effects of leadership.

Consolidation of Position - Organizing and strengthening of a newly captured position so that it can be used against the enemy; occupying force also prepares for succeeding operations.

Crossing Area - A number of adjacent crossing sites under the control of one commander.

Crossing Area Commander - The officer responsible for the control of all crossing units, assault units, and support forces while they are in the crossing area.

Crossing Site - The location along a water obstacle where the crossing can be made using amphibious vehicles, assault boats, rafts, bridges, or fording vehicles.

Deception Measures - The deliberate provision of false indicators to meet enemy EEL. Deception measures are visual, sonic, electronic, and olfactory (FM 90-2).

Deception Operation - A military operation conducted to mislead the enemy. A unit conducting a deception operation may or may not make contact with the enemy. Includes demonstrations, displays, feints, and ruses.

Deliberate River Crossing - A crossing of a water obstacle that requires extensive planning, detailed preparation, and centralized control.

Demonstration - A deception task that is a show of force in an area where a decision is not sought. It is similar to a feint with one exception. No actual contact with the enemy is intended (FM 90-2).

Direct Support - A mission requiring a force to support another specific force and authorizing it to answer directly the supported force's request for assistance.

Display - A deception task which directs a unit to deceive the enemy's battlefield observation. It includes radar, camera, infrared device, and the human eye (FM 90-2).

Engineer Equipment - Engineer float bridging equipment used to conduct water reconnaissance, assault, rafting, or crossing operations.

Exploitation - An offensive operation that usually follows a successful attack to take advantage of weakened or collapsed enemy defenses. Its purpose is to prevent reconstitution of enemy defenses, to prevent enemy withdrawal, and to secure deep objectives.

Feint - A deception task in which a unit conducts a supporting attack to draw the enemy's attention away from the area of the main attack. The objective is enemy reaction favorable to the friendly forces (FM 90-2).

Fire Support - Assistance to those elements of the ground forces which close with the enemy, such as infantry and armor units, rendered by delivering artillery and mortar fire; naval gun fire; and close air support. Fire support may also be provided by tanks, air defense artillery, and Army aviation.

Hasty River Crossing - The crossing of a water obstacle using crossing means at hand or readily available without pausing to make elaborate preparations.

Holding Area - Nearest covered and concealed position to the crossing site where troops are held until time for them to move forward.

Intelligence - The product resulting from the collection, evaluation, analysis, integration, and interpretation of all available information concerning an enemy force, foreign nations, or area of operations and which is immediately or potentially significant to military planning and operations.

Logistics - The planning and carrying out of the movement and the maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with (1) design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; (2) movement, evacuation, and hospitalization of

personnel: (3) acquisition or construction, maintenance, operation, and disposition of facilities; and.
(4) acquisition or furnishing of services.

Mop Up - The destruction of remaining resistance after an initial victory.

Obstacle - Any natural or manmade obstruction that canalizes, delays, restricts, or diverts movement of a force.

Organic - Assigned to and forming an essential part of a military organization.

Reconnaissance - A mission undertaken to obtain information by visual observation, or other detection methods, about the activities and resources of an enemy or potential enemy, or about the meteorologic, hydrographic, or geographic characteristics of a particular area.

Release Point - A clearly defined control point on a route at which specific elements of a column revert to their respective commanders. Each one of these elements continuing its movement toward its own appropriate destination or objective.

River Crossing - An operation conducted as a part of and in conjunction with other operations to rapidly overcome a water obstacle. Tactical objectives assigned by higher headquarters may or may not include terrain objectives within the bridgehead; however, terrain objectives and/or space are required to ensure the security of the force and crossing sites.

Ruse - A trick of some sort designed to deceive the enemy. A ruse may range from a simple tactical trick employed by soldiers on the battlefield to an elaborate trick planned by the strategic level (FM 90-2).

Sector - An area designated by boundaries within which a unit operates and for which it is responsible. Normally, sectors are used in defensive operations.

Smoke - An artificially produced aerosol of solid, liquid, or vapor in the atmosphere which weakens the passage of visible light or other forms of electromagnetic radiation.

Task Organization - A temporary grouping of forces designed to accomplish a particular mission.

Trafficability - Capability or extent to which the terrain will bear traffic or permit continued movement of a force.

Traffic Control Point - A place at which traffic is controlled either by military police or by mechanical means.

West Wall - (Also known as the Siegfried Line). A series of 3,000 relatively small, but highly effective, mutually supporting pillboxes built to protect Germany's western frontier. Antitank obstacles ran in front of the pillboxes (MacDonald).

Zone of Action - A tactical subdivision of a larger area, the responsibility for which is assigned to a tactical unit; generally applied to offensive action.

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